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MAXIMUM POWER COMPUTING

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GF FX: 3D ROCKET SCIENCE EXCLUSIVE REVIEW AND INTERVIEW

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TOP NEW GAMES And about time too! AUDIO RODEO Sound card slam-test



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But be careful - if they drop their weapon and surrender, take your finger off the trigger - shooting an unarmed terrorist is not the Rainbow 6 way. If you want the hostages to live longer than 17 seconds, you'd better be ultra-quiet. There's little tolerance for error, so make sure you're paying attention.

Take em Down

Welcome to the most stunning R6 game yet, thanks to the awesome Unreal Warfare engine. Mingle seamlessly with detailed environments chock-full of destructible objects. The finest explosive effects ever seen, so detailed that you can see the ball bearings burst forth from Claymore mines.

Did we mention the incredible animation that allows you to peek as far as you need, or crouch as low as you want? Thanks to the Karma physics engine enemies crumble and fall realistically. Try not to freak out when you see the bullet holes and blood splatters.

The Real Deal

Once you've mastered the 15 missions in the single player campaign, take your skills to the next level with Raven Shield's comprehensive multiplayer. Don't expect to bunny hop or use wall hacks - this game is as serious as it gets. We're talking one-shot one-kill serious. Five different adversarial modes ensure you'll come back again and again.

Throw in gadgets that allow you to see through walls, such as the heartbeat sensor and thermal sight, and countering gadgets such as fake heartbeat pucks, and it's easy to see why Raven Shield is the ultimate Special Forces simulation. Check out the following ad to find out how your Raven Shield skills could score you a trip to Hong Kong.



our new best friend



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Tom Clancy's Rainbow Six
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Rainbow Six 3: Raven Shield is set to re-ignite multiplayer gaming.

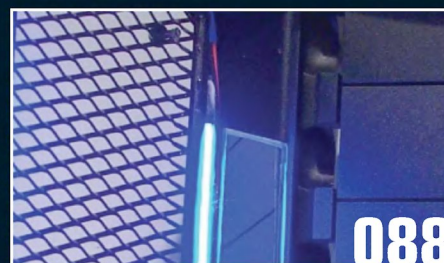
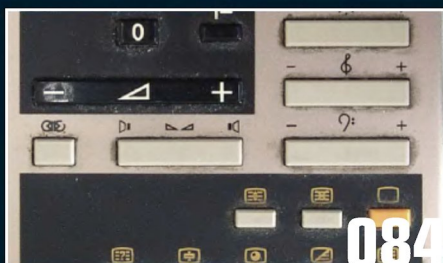
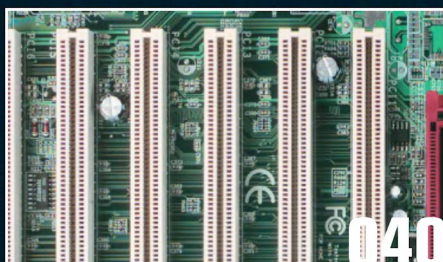


- * 58 weapons
- * 15 missions
- * 6 dedicated multiplayer missions (with more to come in patches & from the mod-making community)
- * 5 multiplayer modes (Survival, Team Survival, Hostage, Bomb & Pilot)
- * Dedicated server support
- * Using the Unreal Warfare engine

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HOT BOX

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We like German. But we like Hot Boxes sent in by Atomicans better. Keiner schlage aus mein heißer Kasten süßen arsch!

GEAR BOX

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We down-shift some kit so you know what to give the up-shift. If you get our meaning.

X-RAY: Gutting the GeForce FX

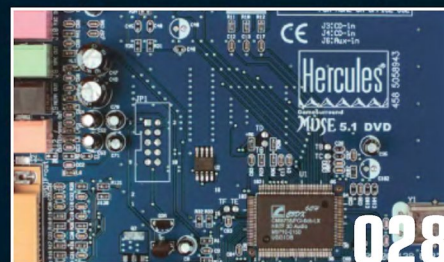
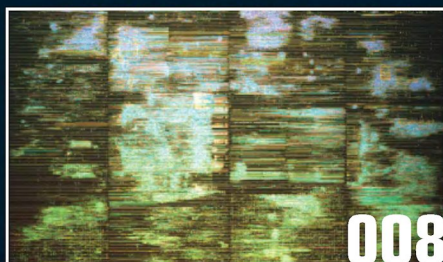
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Now that we've got our filthy benchmarking hands on this ripe video card, we put it through the 3D test machine and throw its scarred remains around the *Atomic Labs*.

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You don't need to be a rocket scientist to know how to fix a computer. All you need to be is Dan Rutter.



H2H: Sound card roundup

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'Who needs music when you've got graphics coming out of your eyeballs?' An attitude that's certainly killed many a gamer who didn't hear that MP40-wielding German (we told you).

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FEATURE: Athlon motherboard roundup

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The choice keeps growing and the chipsets get fired out. Discover which is the most comfortable (and stable) home for your tasty AMD CPU.

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Continue the Linux MP3 journey with young Mark and his groovy mod. We didn't want to use 'groovy', but it really fits the brick.

POST APOCALYPSE

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We're still trying to figure out where all the letters come from.



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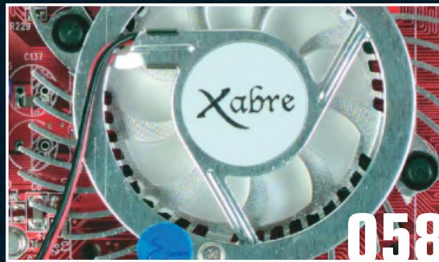
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You won't find better tweaks anywhere else, to be sure.

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Faster than a speeding glowcomotive, it's a glow panel! Ron Prouse shows you how to make one of these sparkling gems.

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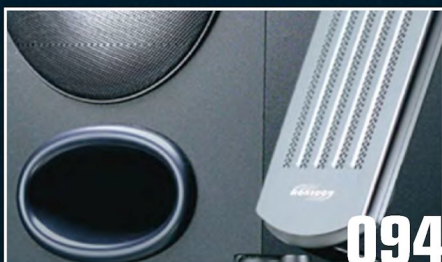
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We'd be surprised if you killed yourself with this. Standard disclaimer applies anyway.

SEX YOUR DESKTOP COMPETITION

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Not literally of course. Mind you, it's your Desktop.



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Beat your friends a win some nifty gear. At the questions. . .

FALLOUT

098

Be it viruses or worms, John Simpson has contracted something.

Hello and goodbye

Will we be saying farewell to the GeForce FX 5800 Ultra so soon after our first introduction? Yes indeed we will – unless you're one of the lucky 100,000 who will own a sample of this historical IT curiosity. It's a gutsy move for NVIDIA, scaling back the planned distribution of FX by such a huge degree.

What was to be the biggest technical step forward for NVIDIA in its history has been relegated to a pebble in a bigger string of stepping-stones for the company.

Looking at the Savage 3Ds of the world, and lately, the Xabres, the established path for loser-chips is to leave the product out there to sponge up as many retail dollars as possible. Taking a full bath on FX 5800 Ultra shows that NVIDIA has an extraordinarily aggressive strategy. ATI's largely unexpected push into the performance segment has shocked the industry. Yes, ATI has for a long time said it will release a killer chip – but so has every other company, with none coming close to NVIDIA. Ever.

Now, the FX 5800 Ultra is no better than the 9700 PRO, and has already lost the race for market dominance.

With details on ATI's R350 due anytime, we're seeing NVIDIA fall behind not by just one generation, but two – if NVIDIA cannot quickly turn around production silicon of the NV31 and NV34 GPUs.

While, yes, the winner in the end is the consumer, blah de blah. But the really exciting bonus 'win' for us is that we're now witness to a fascinating spectacle, over the year ahead. With these two Godzillas giving it all they have to a battle for supremacy – from which, conceivably, only one may emerge, we wonder what Matrox, S3, SiS and Trident are up to?

The gap between the big guns and the middleweights is quickly increasing and the GPU landscape could well be very different by the end of this year.

Closer to home, there are changes of scenery. Some glad, some sad. We're saying bye-bye to Scanner, our games 'preview' section. Dedicating three to four pages to three to four games wasn't an economical use of mag space – considering there are so many more games which could be covered, in a given month. We're looking at a more cleverly thought-out replacement, so you still get your Atomic-style head-up on what's gamey.

With much sadness, we're also saying goodbye to parts of *Atomic* that are close to our hearts. Kate Marsden – K8y K8 – is leaving us. This is her last issue. Kate will be strapping on a backpack and carrying it around the world for the next year or so.

While we're insanely jealous of the fun that lies ahead for her, we're just a bit teary, too. Kate's been with us since the beginning and the beauty of *Atomic* is all her work.

Good luck and goodbye Katey, you rocked our world.

It's bye-bye too, to Cindy the Barrel Girl. Cindy is the *Atomic* helper girl and happiness maker. She's off to uni to learn how to be smarter than us; Cindy will be missed by all the crew here.

With sad comes glad. Usually. Next issue we'll have our new designer on board and *Atomic* will enter a new era. Fear not of massive change, for *Atomic* ain't broke and doesn't need fixing. Subtle stuff will creep in, though, and our new designer is rather brilliant, so we're energised with excitement.

Ben Mansill, Editor

Bye-bye Katey :(



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Short Circuits

◀ Bigtime hacker Kevin Mitnick is no longer in gaol and his new business has a Website, Defensive Thinking (www.defensivethinking.com). It's a consultancy firm that teaches people about hackers. Shame he couldn't show his Web admin a few tricks: the site was hacked twice in the last two months, with one of the assailants asking for a job. Turned out the version of IIS Mitnick's server was running wasn't equipped with recent patches. That'll teach him for ignoring Microsoft. . . and maybe Steven Gibson.

◀ Return to Castle Wolfenstein – a big disappointment? We didn't think so, but it was annoyingly average, which is probably why Activision planned an expansion. That plan, however, has fallen through because the single player campaign wasn't working out, RTCW: Enemy Territory will be released as a free multiplayer expansion. We've had a quick look at some screenshots, and it looks similar to BF1942. The add-on will add a variety of features, including a covert op class and enhanced engineer class able to construct buildings during combat. Just hope it's not too much a rip-off of BF1942.

◀ Don't you wish there was a way to be rid of scam sites? Project 'Scamseek' aims to develop a system that can identify scam sites depending on the wording of text. The project will involve the Macquarie and Sydney unis, Capital Markets Cooperative Research Centre and the Australian Securities and Investment Commission. It will be the largest language technology research endeavour in Australia ever.

Liar, liar, your card's on fire

Last month, NVIDIA decided to maroon its chief scientist in the outback of Australia after a not so hot GeForce FX launch. Dr. David Kirk didn't waste time after arriving; unpacking his suitcase, he showcased the first GeForce FX in Australia to a small press conference, and *Atomic* just had to be there.

After giving an hour-long presentation titled 'The Future of Graphics', detailing where we've come from and how 3D is evolving, he wowed the audience with NV30 tech demos. As he lightly tapped the demo icon, a hair dryer blew out of no where – jovial laughter poured into the room as the GeForce FX's decibel busters kicked into high gear.

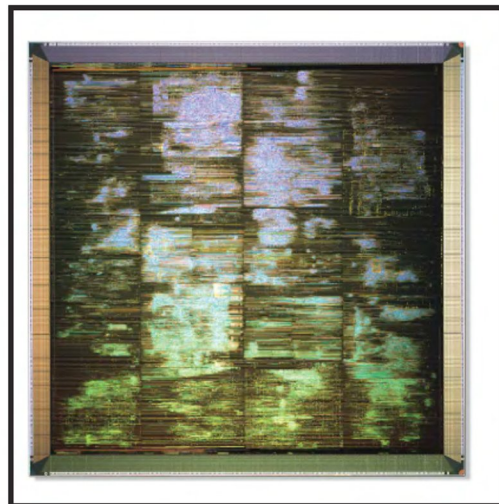
The demos were coded in OpenGL using custom NVIDIA extensions. For once, NVIDIA's launch tagline – in this case, 'the dawn of cinematic computing' – didn't seem too exaggerated. What we saw showed for the first time how close we are to 'Toy Story; on-chip' – arguably we're already there. DirectX 8 gave us great shiny and bumpy material. With this generation, objects can be made organic, rusty and fleshy, which is a huge leap toward reality.

The real news though didn't come from the presentation. For all the great technical achievements that the NV30 is, it simply didn't blow away the R300. Compared to the R300, the chip is using a smaller process, clocked 125MHz faster, packing 10 million more transistors and employing faster memory. But real world performance is a totally mixed bag, from slightly faster to three times slower (pixel shader performance). Technically it really isn't explainable and NVIDIA's drivers at worst can't do this much damage. After much investigation, here's the news for you: the GeForce FX doesn't actually have its marketed eight pixel pipelines, it only has four.

When *Atomic* exclusively interviewed Dr. Kirk afterwards, we asked if the NV30 was an '8x1' or '4x2' renderer, the former number representing the pixel pipelines and the latter the number of texturing units per pipe. He dodged the direct answer, claiming the way the GeForce FX works is more like a collection of processing elements than individual attached pipelines. He also noted some games render the Z-buffer in their first pass (like Doom 3) while others render textures first. This changes how GeForce FX allocates its pixel pipelines.

What does this mean in reality terms?

After all, we still would like to know how many effective pipes it is in today's games. There's a good reason why you won't find this simple answer in any of NVIDIA's whitepapers and how every product launch has either flatly lied about this or dodged the issue all together. The GeForce FX, for all intended purposes, really uses a 4x2 pipeline arrangement in most



ABOVE: GeForce FX – how many pipes can you see?

of today's games. Where it can actually calculate eight values a cycle is during the first pass of Doom 3 or Z-buffer-related tasks, an optimisation, while intelligent, could not match the brute force eight real pipelines of the R300. In a nutshell, the NV30 is 4x2 for real pixels but is capable of acting as 8x1 when doing Z-buffer calculation.

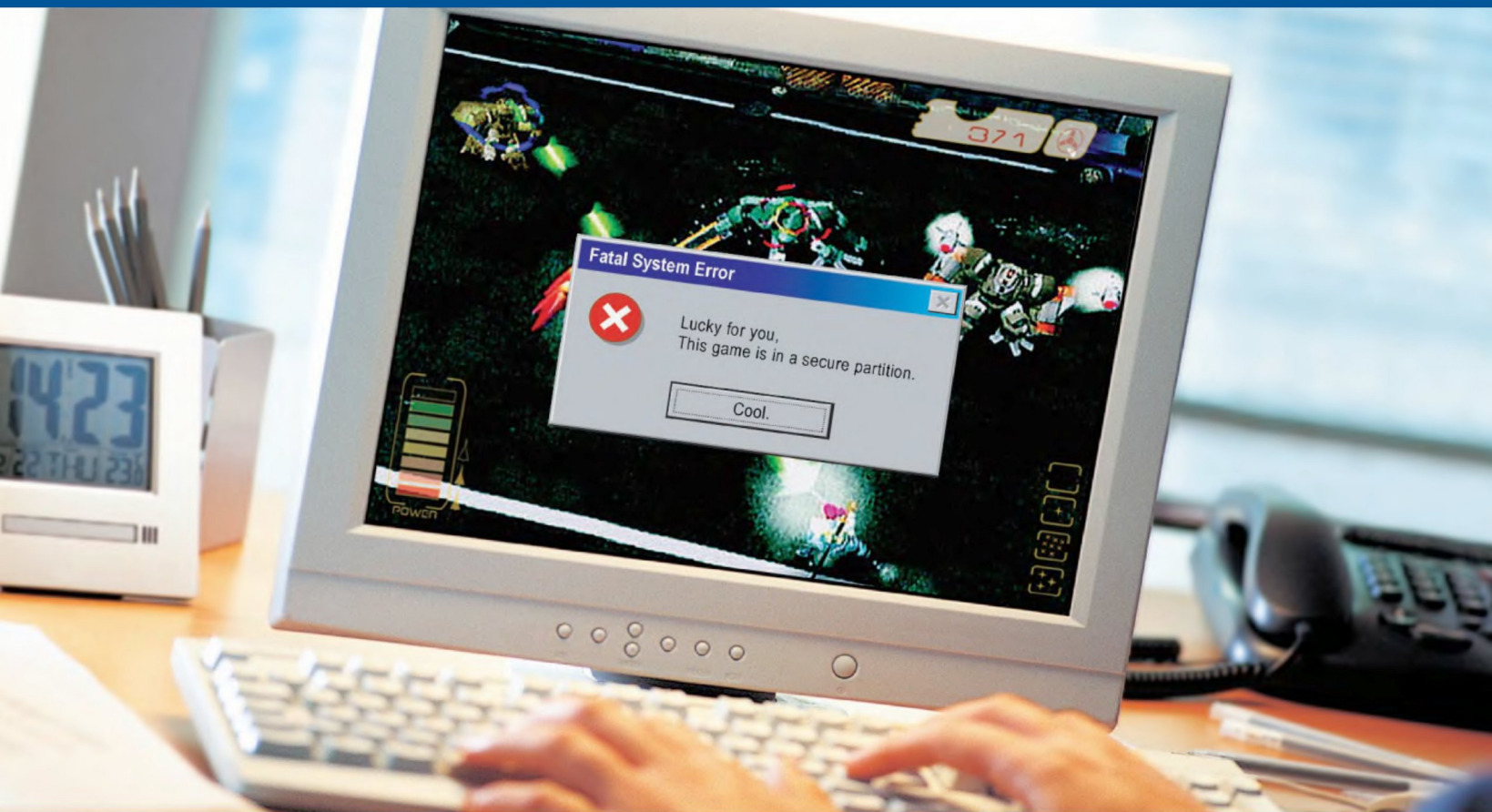
This leads to the next puzzle: if it's only four pipes with two texture units then what did the outlandish 125 million transistors go toward? How did ATI manage to build a faster eight-pipeline chip on an old process with fewer transistors? One reason is that the NV30 is carrying a lot of excess baggage. It carries a legacy DX 7 hardwired T/L engine while the R300 has dumped it, using the vertex shaders to perform T/L instead.

The NV30 carries legacy integer registers to perform old DirectX 8 operations faster, while the R300 converts and calculates everything in its DX 9 floating point pipelines. So in the end, the R300 uses 96-bit colour in the pixel pipelines while NVIDIA has separate hardware to do DX 8 integer, DX 9 64-bit and 128-bit. Also of note, ATI saves some transistors by not doing full 128-bit. NVIDIA supports more registers and longer shaders, which bridges the transistor gap somewhat.

For us Atomicans, the GeForce FX is a very powerful card. It has a funky architecture (dynamic pipelines) and some not so elegant parts (legacy baggage). Its shaders are more capable than the R300 by a good deal, but that isn't to say the R300 isn't already highly shader-capable.

What NVIDIA shouldn't have done is mislead the world to believe it was an eight-pipeline card. It's almost as bad as marketing a three-door hatchback as a Tarago. It really didn't have to, because this hatchback is a 500MHz monster with the turbo-fans to prove it. ◻

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Short Circuits

◀ An unexpected blast from the past, word recently leaked out that Tseng Labs are to make a comeback with a new DirectX 9.1-based graphics chip, provisionally called the ET6000 Ultra. After being first to market in the mid-1990s with a 128-bit 2D chip, Tseng Labs has re-engineered the chip into a 3D unit with an amazing 512-bit memory bus. According to our sources, the card will use a 90nm SOI process and score around 10,000 3DMarks in 3DMark03. The product is due to be announced during a keynote address by John Romero at the 'Graphics: Crap That's Quick' conference in Taipei on the 1st of April.

◀ Well, dying is one way of getting out a trial. Thirty-two year old Daniel Feussner, an ex-Microsoft employee, deployed this very tactic just a few weeks ago, after he was accused by prosecutors of stealing and selling \$9 million worth of MS software. Feussner was arrested on Microsoft's Redmond campus, after 15 complaints of computer fraud were filed against him.

◀ 'Script kiddies! Don't unite!' is the message the National Infrastructure Protection Center (NIPC) has sent out to wannabe 'patriotic' hackers. With tensions between US and Iraq running high, some hackers may look to strike a pre-emptive cybernetic blow, or attack US computers in an attempt to protest against any sort of conflict. The NIPC is afraid that such an action would backfire. Studies have shown that illegal online activities increase during times of international stress, so it's also a 'heads-up' to all computer owners.

Die BIOS. Die.

We've lived with that funny old bit of code for two decades now – two *whole* decades, which is a bloody Ice Age twice over in the IT biz. Such a long time in fact, that it'd be hard to pry the gnarled bit of assembler from the fearsome grasp of your motherboard. Actually, if you decided to do a little BIOS prying, you'd likely end up with a *dead* motherboard. And we don't like dead motherboards, even if they make great projectiles for FrisbeeMark.

Intel has been hard at work developing a replacement – and according to Mark Doran, the principal engineer masterminding it, the original meeting was a 'three-day bitch session.'


Buying BIOS its ticket and driving it to the airport is EFI, or Extensible Firmware Interface. Instead of being programmed in assembler, EFI will be written in C, and will allow for add-ons, utilities and performance tools to be made for it in the language. The lack of a standard for BIOS creation means the potential for conflicts between motherboards and software lingers in every system. With EFI, Intel hopes to banish the conflict creature, and introduce a better platform for low-level system software design.

The replacement will support high-resolution graphics, which will allow for a proper GUI to make changes to basic system settings. EFI will be its own operating system – which introduces a small problem. Some of the information for it is stored on a reserved part of the hard drive. If you have a crash, or decide to format, you'll have to reconfigure your system from scratch. When it's introduced, Intel may have a solution.

Two important features of EFI are its ability to perform a 'sensible reboot' after a system crash, and its Digital Rights functionality.

As EFI works at the basic system level, the BIOS replacement will allow for the swapping of base drivers for such things as network and USB controllers. By swapping a bung driver after a crash, you can reboot properly – or *actually* reboot if you couldn't.

The Digital Rights management side of things will give developers more control of system hardware, allowing for the inclusion of security features. Why wait for Microsoft?

Finally, EFI will have legacy support for current BIOSes, so the introduction shouldn't be disruptive. No release date as yet, but the low-level OS has been demonstrated by Doran, so it can't be too far away. 

atomican

Atomicans are never ones to pass up on the opportunity to have a punt.

Whether it's the release date for Duke Nukem Forever, or a game of two-up on ANZAC Day, we don't mind having a go.

So, various Atomicans have started up a few tipping comps for the football codes. AFL, NRL, Super 12 and cockroach racing (www.atomicmpc.com.au/forums.asp?s=1&c=1&t=4851, [t=4860](http://www.atomicmpc.com.au/forums.asp?s=1&c=1&t=4860), [t=4850](http://www.atomicmpc.com.au/forums.asp?s=1&c=1&t=4850) and [t=4890](http://www.atomicmpc.com.au/forums.asp?s=1&c=1&t=4890) respectively) are all on offer. GO THE KNIGHTS!

February was also the season of love culminating on Valentine's Day (to which I say 'Bah, HUMBUG!').

As always people have problems in love, and those with a bit more experience are always there to lend a hand.

Two such examples are the case of the amd_guy having a bit of a crush on his teacher at school (forums.asp?s=1&c=1&t=4670 and [t=4870](http://forums.asp?s=1&c=1&t=4870)), and TheBottom wondering the best procedure to find geeky or nerdy members of the female of the species (forums.asp?s=1&c=1&t=4575). I hope that it works out for you both, and any other Atomicans in or out of love.

Somehow (I don't question these things), Atomican Moz has been able to break into the FBI, CIA, Scotland Yard and Burke's Backyard and procure the file on our resident alien Virtuoso (forums.asp?s=1&c=1&t=4658).

I would have never guessed that he was a champion ice skater, but the thought of Nikki Webster is just too much to bear.

Maybe it all has something to do with the disappearance of Mr. Dark Lord.

Conspiracy or Coincidence?

You decide.

A big thanks must go out to all Atomicans who donated to help Clisco get a new bike (forums.asp?s=1&c=1&t=3680).

With the help of Mael and Digweed, she was able to get her new bike from the great guys at Pedal Inn (www.pedalinn.com) and is now using it as bikes are used.

That's all for this month, and remember. . .

'Love is a smoke raised with the fume of sighs,
Being purged, a fire sparkling in lovers' eyes,
Being vexed, a sea nourished with lovers' tears.
What is it else? A madness most discreet,
A choking gall and a preserving sweet.'

WHAT'S HOT

- 8x1
- Bart
- FX exhaust plasma
- High-5
- Dawn the FX Pixie

WHAT'S NOT

- 4x2
- Buffy
- Xabre
- The Wiggles
- Gigi the Albatron Pixie



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Beyond baud

The BBS was born 25 years ago and sparked a computing revolution. Take a trip back with Ashton Mills as he pays homage to our humble heritage.



It was back in 1977 that a chap by the name of Ward Christensen first penned a program to transfer files over a modem between machines running CP/M. He conspicuously called it MODEM.ASM and sent it out to the CP/M community to play.

The program would later be streamlined into a protocol by the name of XMODEM which, in turn, would provide the impetus for the YMODEM and ZMODEM protocols – the file transfer mechanisms that still power modem-to-BBS file transfers to this day.

In 1978 Ward teamed up with Randy Suess, who, like Ward, was a member of a local computer user group called CACHE (Chicago Area Computer

between members on a local BBS, but between members of BBSes from around the world. In a time when the Internet was just the domain of military and university institutions, you could dial up your local BBS and read messages posted by someone herding sheep in the Scottish foothills.

I remember when I first discovered that you could dial into other computers and, well, *do stuff*. I thought the whole idea was awesome. I was given a number to dial by a friend and, with a borrowed 1,200-baud modem, called a file BBS whose name I can't even remember. The ANSI login screen appeared, I made an account, and life at home was never the same again.

Like any other teenager discovering the phenomenon for the first time I did the only thing there was to do: I got addicted to it. The place to be in Sydney was Active BBS, with nine lines of chatting joy, full of an array of interesting characters (Doc Spooze was even known to occasionally pay a visit!)

Online chatting was such an important part of life back then that I remember clearly the almost sad occasion I left a modem cord at a friend's house and was unable to hook up my modem when I got home.

I couldn't wait to get the crucial cord back, so I ripped a spare phone cord, opened the modem, used trial and error to find out which wires I needed and Blu-Tac-ed them onto the modem's PCB. The electrons flowed again, I was online, and that night the chat tasted better than ever.

And it was all console-based of course: all text, all ASCII and ANSI, even the prOn. But at the time it was all you needed. Long before the Net came along, BBSes were, for many of us, the first taste of the potential of an online world.

In fact we owe much to this bastion of our computing history. Many of the conventions you see today on the Internet can be linked to BBS days: Netiquette, smilies, flame wars, forums, and even the ancient art of illegal file trading. Yes, people used to leech O-day warez at a staggering .3Kb/s or, if their rich dads had brought them 14.4Kb/s modems, a blazing 1.5Kb/s. Cable is over 350 times faster than this. We have it *so* good.

Today, many BBSes have faded silently into the ether, but some still remain alive, loyally serving their communities. Many are even hooked up to the Net allowing you to telnet in and explore their esoteric joys.

If you missed this era of our computing past, grab The Australian BBS List from www.westnet.com.au/centuryp and give one a go. And if you want to see what chat was like ten years ago telnet into Active on activebbs.org:5885, and say ACME sent you!

'When the Net was the domain of the military, you could dial a BBS and read messages posted by someone herding sheep in the Scottish foothills.'

Hobbyist Exchange). They bandied about the idea of setting up a computer in place of the community's voice message recorder to allow people to dial-in and leave messages.

With a protocol already in place to transfer information between computers, Ward went ahead and wrote a simple program designed to operate like a bulletin board for storing messages while Randy built the hardware (which used a teensy 300-baud modem). In just two weeks they started testing what would become the world's first dial-in bulletin board, later known as CBBS (Computer Bulletin Board System).

And from that, as they say, cream pies are made. CBBS spread and soon BBS systems sprang up the world over giving birth to a new industry.

Before long you could dial into a local BBS to read and post messages, download files, and even chat in realtime with other currently connected users. Networks such as FIDONET appeared that allowed BBSes to communicate with each other and thus allow the transfer of messages not just

My machine wasn't operating in a void anymore.

Any serious BBSer decked out their machine to maximise transfer speeds – purchasing modems capable of retraining themselves to cater to line conditions and buying serial cards that came with the newer 16550 FIFO buffered UARTS (which all motherboards come with today and you can still see by clicking under Ports → Com 1/2 → Port Settings → Advanced in Device Manager).

Hardcore downloaders would use the latest modified ZMODEM protocols or, if they were feeling lucky that day, fire up YMODEM using 1Kb blocks and forgoing error correction – why waste valuable bytes on CRCs?

You could dramatically decrease download times for large transfers by dropping error correction, but it also meant you had to have a clean line because just a single hiccup would render the download useless.

There was then, as now, quite a science to speed.

It wasn't long before I discovered the seedier side of BBSing – online chat.

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Boot up screen change

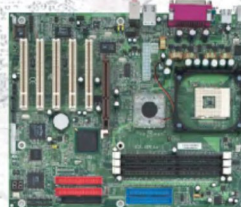


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Boot up screen change



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Shoot the messenger

So many annoyances, so little time. Computers are tops, but they're not without their hair-pulling factors.



I like computers – I really do. If you don't have one, I would strongly recommend that you do yourself a favour and buy one today. Heck, buy one *right now*.

Unfortunately, computers sometimes make me mad. They really do.

So I thought I'd list some of the things that bug me to hell, as well as a couple of tips to get around them.

Well. . . first things first: installing Windows XP. I install XP fairly often – whether it be on my own systems at work or at home, or when testing gear in the Labs – and I absolutely hate the fact that when it's finished it shows me the Complete Lobotomised Moron Edition of the XP interface. I'm 'encouraged' to take a tour of XP; file extensions are missing;

rename 'msmsgs.exe' to something else. I just checked mine, and when I installed this system I must have been particularly irritated and renamed it 'msmsgs.ARSE'.

At least Windows XP does dispense with some age old annoyances, such as that idiosyncratic Windows 9x tendency to require a full reboot after changing *any* network settings. I found the best way around that was to do a 'soft boot' by holding down Shift when you restarted.

Then again, shutting down was never one of Windows' strong points anyway. Back in the day I remember wandering through the office after hours and seeing the eerie blue glow of a dozen PCs sitting there saying 'Windows is shutting down'. Thankfully, a trip into the BIOS and Power

Which reminds me of the plague of modern software: the patch. Yeah, I know patches can introduce new features (hats off to Neverwinter Nights), but more often than not they are the tool of greedy publishers who push games out before they have finished comprehensive quality assurance testing, relying on the assumption that the gaming public is happy spending an hour downloading a 20MB patch over a modem line just to get the thing working as advertised on the box. Well, I hope those greedy execs who make those kinds of decisions die lonely (ooo, that's harsh).

Oh, and the 'feature' that is probably one of the most universally hated elements of any software package ever in history: the Office paperclip. Sweet merciful crap, that's annoying. I've even noticed people across the room get annoyed when they just notice that someone else nearby hasn't disabled the thing. (And who said this generation is apathetic?)

Another thing that really rubs my rhubarb against the grain is the fact that Microsoft seems insistent on reminding me that my computer is, well, My Computer. Like, thanks but no thanks. Do they think I'll forget? Do they think if I see a folder cryptically named 'Documents', freak out and think I've somehow lost 'my' work? Get your hand off it Bill. . . and XP is riddled with it! My Computer, My Documents, My Pictures, My Movies, My Music. . . etc, etc. Who the flying fruckus else is it going to be?

Thankfully, a few of my old favourite annoyances, such as the 'My' syndrome, are at least curable through Windows Power Toys (although it could be an annoyance in itself that Power Toys is not built into Windows). Things like putting 'Shortcut to. . .' in front of every shortcut defies comprehension, but those words are short lived with a swift application of Tweak UI.

Well that's ten annoyances, and I'm sure there are many more that you suffer through every day. Jump on the forums at www.atomicmpc.com.au, and let us know the ones you hate the most. I might even give out a prize for the best of the worst annoyances.

'... the most universally hated elements of any software package ever in history: the Office paperclip. Sweet merciful crap, that's annoying.'

there are no desktop icons except the Recycle Bin; Windows Explorer opens to My Computer; and I can't see the 'C:\' drive, Windows directory or Program Files; regardless of my install options, the default language is still US English (an oxymoron of sorts); and so on and so on. And to make things worse, when I log on to someone else's machine on the network, it gives me the same malarky, forcing me to change all the settings to 'normal' again.

What I wish is that Microsoft includes two big fat buttons when you start installing XP: one labelled 'Experienced user, please don't patronise me', and the other one labelled 'Half-wit, please assume that anything I touch will be corrupted or deleted, so keep me away from the good bits'. Then I could at least choose to be a half-wit of my own accord, and not have it thrust upon me.

And talking about installing XP, what's with that insidious Windows Messenger? Sure, some people love it – more power to them – but if you don't want it, it can be a bugger to disable. The only sure fire way I have found is to close the tray icon, go into Program Files -> Messenger and

Management Control Panel to enable APM usually fixes that – unless you have stubborn hardware.

Booting up is a weird issue too, although it's starting to get better these days. I remember wondering ages ago why it seemed as though my PC went through the process of detecting all my hardware from scratch every time I turned it on. It's not like I'm going to change hardware every time I boot, so surely it could just remember what I had and only scan if I tell it I've changed something. Nah, I'm sure that would make too much sense. At least now Microsoft and Intel are rabidly trying to abandon all those legacy devices that slow things down, like serial ports.

And while we're on the topic of things that can't be skipped, one thing that harrows my computing experience to this day is games that have intro screens that can't be skipped. Oh, for the love of all that is holy, I don't need to see who bloody well published this game locally a thousand times. I doubt it'll make me buy games from that publisher in the future – I prefer to choose my games based on their individual qualities, thanks.

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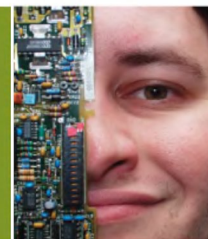
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Digital couch potatoes, arise!

That's right – record all those Sean Connery classics while you work. Or, maybe not. As far as Dan Rutter's concerned, it is all just a pain in the arse.



PVRs kick arse. It's a shame that Aussies can't use 'em.

Well, we can, but it's a big pain.

A PVR, for those of you a few inches behind the nerdly cutting edge, is a Personal Video Recorder.

That's one of the dumber acronyms of our time; when last I checked, there was no law prohibiting personal ownership of VCRs.

They're also known as DVRs, or Digital Video Recorders. They record video to disk, generally in MPEG format.

A computer with a video capture card in it will serve as a basic PVR, and every rinky-dink TV tuner card on the market today comes with software that'll let you do VCR-ish tricks with your PC.

'I'd pay to see a PVR enthusiast try to persuade Kerry Packer to tighten scheduling, so people can use hard disk recorders to skip his ads.'

Better models give you basic PVR features too, like pausing live TV (and keeping on recording it in the background; PVRs can record and play back simultaneously).

Proper PVRs, like the market leading TiVo and ReplayTV, can do a lot more. They can, for instance, automatically record stuff you seem likely to enjoy.

Tell your TiVo to record *Dragonheart*, *The Hunt for Red October*, *The Rock* and *The Name of the Rose*, and it'll have a hunch that *Indiana Jones and the Last Crusade* might, for some reason, be right up your alley.

PVRs first came out in the States in 1999; they've been popular since 2000. Not just among incurable couch potatoes, either; just because they automatically record so much stuff doesn't mean you have to watch it all. It just means you can. Any time you like.

No more undercooking your eggs, so you won't miss the beginning of *Futurama*, ever again.

No more scrabbling for a tape and hurried program-setting so you won't miss *The West Wing* while you're out doing something else.

PVRs don't figure out what's on by mental telepathy, of course. They have to get program guide data – including all the metadata about who's in what, genres, episodes in series and so on – from somewhere.

The 'somewhere' is a service run by the PVR maker, or one of their affiliates, which the PVR accesses by dialling in with a built-in modem in the wee small hours now and then or, for newer models, by using your broadband Internet connection.

Which is all very well, except that no PVR program guide services exist for Australia yet.

Australia does have digital TV guides; ebroadcast.com.au, for instance, for

which enterprising hackers have created software which converts Web listings into PVR guide files.

Getting a suitable PVR that works in Australia, though, requires further hacking – if it's a US model then you'll need to convert it from NTSC to PAL, and the tuner will need changing too, at the very least.

It is not an off-the-shelf proposition.

There's a further problem with Aussie PVRing: if you just want to record free-to-air programming – and that's all most Australian TV viewers watch, much to the dismay of Foxtel and Optus Vision – you have to contend with the mystic ability of the Aussie commercial networks to run shows at times other than those promised.

It happens all the time, these days. A show or two runs over-length for some reason, pushing everything ten, twenty, thirty minutes late, until the slack's pulled back in by dropping one of the 'Butt-Bender Super Exercise Hamster Wheel For Humans' ads at three in the morning.

As a result, people who program their VCR to record the Formula One at

0200 hours, and neglect to use a whole five hour tape to record a two hour event, get a sinking feeling when they discover that a movie-length episode of *Silk Stalkings* hadn't quite started yet when the race was meant to be kicking off.

A cynic might suggest that this extraordinary programming sloppiness is deliberate. Not to screw up PVR users – there aren't enough of them yet for the networks to care – but just to annoy VCR users, who're likely to fast-forward through the ads.

Commercial networks really do not like you doing that.

I'd pay money to see a PVR enthusiast try to persuade Kerry Packer to tighten up scheduling, so that people can use hard disk recorders to more easily skip his ads. Man – they'd never find the freakin' body.

You can get around sloppy scheduling with fat ugly recording margins on either side of each timeslot, of course, but then you can't record consecutive programs on different channels; the current mainstream PVRs can still only tune one channel at a time.

And there's not much else you can do.

Grabbing TV shows via your friendly neighbourhood legally dubious P2P client is not a PVR alternative.

Quite apart from finding what you want, and download limits, and the agony of people still stuck on dial-up – P2P program grabbing, like fooling with VCRs, takes time out of your day. PVRs give you time back.

Things'll get better, though.

Australia may never be a big enough market to get full-featured commercial PVRs, but all that's needed is a free local program listing service (something just like EBroadcast and www.imdb.com tied together with a fat wad of Perl code. . .), with accompanying software that works with various popular tuner cards. Even with multiple tuner cards, so you can record more than one channel at once.

If you're holding your breath for this, though, I think you're going to be very blue indeed before you can chuck your timeshifting tapes.

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- ASUS 24 x 10 x 40 CD-RW
- 3Com 100Mb PT NIC
- Two blue cold cathodes
- Perspex side panel w/ fan
- Toilet door latch

The story

I liked the idea of the 'Heavy Water Project' in hiding the cables in a shiny tube, but didn't like the way it went over the side of the case. So I set out modding the PSU. I removed all the surplus cables off the PSU's circuit board and re-soldered new, longer cables, which run down the tubing on the mobo tray and the front of the case, then through holes I had drilled in the chassis.

Then I cut a big blow hole in the top so I could mount a 92mm Sunon silent fan, replaced the grills at the back with chromed fan grills so the two 80mm fans can pump as much air as possible in.

The case is slightly pressurised, which feeds the ever hungry ThermalTake SmartFan2 with enough air to keep the SLK-800 cool.

The best part is that I can now overclock my AthlonXP 2000+ to over 2.0GHz and only have a temp rise of two degrees. □

Freon by ColdBurn



Technical details

- Athlon XP 1700+
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- 20GB Fujitsu 7,200rpm
- 24 x 10 x 8 Sony CD-RW
- 64MB GeForce2 MX
- SoundBlaster Live! Value
- Cambridge SoundWorks 4.1
- AOpen HX45B Case
- Just Cooler 300W PSU
- Blue 30cm cold cathode
- Home-made LED diffuser box
- 6,500mcd LEDs

The story

This is my second case mod. I was looking around at other mods and the majority of windows are square or wiggly cut squares.

I really liked the cases with Klingon symbols or AMD symbols cut into them because the owners showed some flair and confidence to go the extra distance. When I found the right shape, I began to mod. The window and the front bezel were cut using a Dremel tool.

I then sprayed the interior of my case gold and the exterior matt black. Then I ran out of black paint and switched to black enamel which was glossier. I top coated with an acrylic, which is essential to stop lots of minor scratches. The Perspex sheet sits behind the hole and is held in with case fan screws.

I then put all my PC gear back into the case and put in all the lights and viola! A new case mod! □

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Gazza's kinda warm box



Technical details

- Pentium III 1.0GHz
- 512MB PC133
- ASUS CUSL2-C
- MSI GeForce4 MX440
- 30GB IBM hard drive
- Pioneer DVD116
- Lite-On 24x CD-RW
- SoundBlaster Live! DE 5.1
- 3Com 10/100 LAN card
- Ricoh PCI cradle
- 802.11b Wireless LAN card
- USB Webcam
- Pine wood panels
- Two coats of stain, one gloss

The story

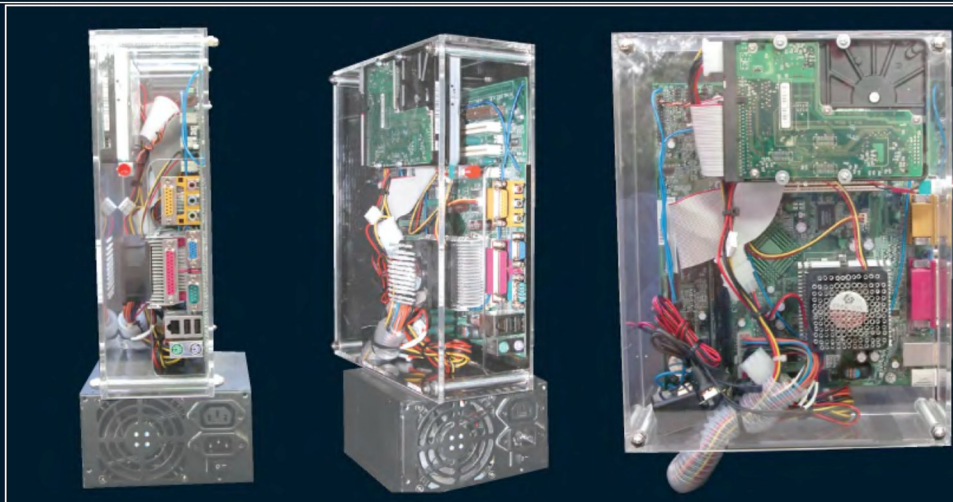
Pine panels were screwed to make the top and sides – the front panel had to be spaced out with 1.5in pine strips to allow for DVD and CD-RW clearance. Nails were used to join some of the wood, but this was a mistake. Hand file, jigsaw and Dremel made the drive slots, floppy slot and button holes. Buttons are all hand-made from wood and working, even the floppy eject button. The power button has plastic

light guides that allow the power and HDD light to be seen, and it also helps keep the button centred.

No case window is needed as it would ruin the look, so I placed a Webcam inside the case to allow people to see the guts whenever I'm online. I've dubbed the idea 'CaseCAM™'. I'm planning a few bright LEDs, some laser diodes, a mini-smoke machine and a rotating mirror ball. . . hehe. Upgrade to P4 is in the cards.



David's Midget



Technical details

- AMD Duron 700MHz
- MSI Micro-ATX MS-6378
- 128MB PC133
- Global WINFOP32 HSF
- 30GB Western Digital HDD
- Onboard 10/100 Ethernet
- Onboard sound
- Onboard video
- Generic 300W PSU
- Electro-luminescent glow wire
- Custom-built Perspex case
- Touch screen
- Custom-coded Winamp layer
- PSU attached w/heavy duty velcro

The story

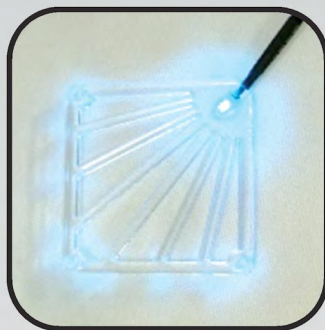
Having done the mammoth-sized full tower case, I wanted to create a much smaller machine, so it could be used as part of an entertainment system, micro-server or even an in-car computer.

I went out and found the smallest AMD-compatible motherboard I could find that had sound, video and LAN onboard to remove the need for PCI cards and minimise the height of the box.

Once the components were sourced I had a Perspex case custom-built. Unable to find a small PSU I spray-painted a standard one black and mounted the Perspex using heavy-duty Velcro.

I sourced an old touch screen, which was missing drivers, and coded a program that reads in values from the touch screen and then directs Winamp to take the appropriate action. Other than playing music this machine can also act as a game and database server.





LED fan grill

SUPPLIER: Anyware
www.anyware.com.au
PHONE: (02) 9879 5788
PRICE: \$20

Are we the only ones who are getting just a little sick of bloody LEDs?

Sure, a couple in a custom configuration is cool, but it seems impossible to think of a device these days that hasn't had a plethora of these blinding little buggers strapped to, mounted on, or inserted inside of it. Just when you thought the LED troll couldn't possibly wangle its way into anything new, along comes this fan grill to prove just how lame this troll can be.

Get back under your plastic bridge, Mr LED troll, you're scaring us with all your glowy bits.

Anyway, about the fan grill. It's exactly what it says it is – a plastic fan grill with a tiny, crappy LED buried in one corner.

The LED itself is kind of funky in that it changes colour as it flashes. But we're sorry to say it's just as lame as you'd expect. We can just imagine some devious inventor thinking 'The kids are going to love this lame-arse piece of crap. It's so damn lame they'll think it's cool. Genius!'

All we can say to that is krunt off, we've got a bit more taste than you give us credit for. A hell of a lot more taste, actually.



Xaser II Aluminium mouse pad

SUPPLIER: Anyware
www.anyware.com.au
PHONE: (02) 9879 5788
PRICE: \$24.90

Just when you thought you couldn't get a product lamer than the LED fan grill that just won this month's Logie of Lameness, along comes this stinking piece of poopsy. We'd actually prefer to use a pile of dog poo over this hunk of overpriced metal for one darn good reason.

You see, thanks to the rough metallic surface of the mouse pad, every time you move the mouse it feels like a tiny rake is being dragged over the surface of your brain. It's haunting and uncomfortable, and it'll send even the strong of mind into a series of convulsions.

It reminds us of the sensation felt when a steel shovel is dragged over bricks, or extra sharp nails are scratched across a three-kilometre blackboard. Yes, it really is that annoying. And painful.

Compounding this problem is the tiny size of the mouse pad – gamers are going to find it way too small.

It still works well enough, with none of the optical mouse incompatibilities we saw with the Lian Li metal mouse pads, but unless you're a smack head, and therefore so out of it that you won't notice the texture, you'd be well advised to direct your cash elsewhere.



IMAK Smart Glove

SUPPLIER: Imak Products
www.imakproducts.com
PHONE: n/a
PRICE: \$34 each

On to something a little more serious. RSI. Once regarded as a load of bollocks 10 or so years ago, it's now seen as a serious side effect of prolonged keyboard and mouse use. And it's a problem that's only going to become more prevalent as we spend longer amounts of time in front of our computers.

Which is why you might find these gloves to be a bit of a God-send.

Each glove has a stiff rib across the top of the glove that encourages straight wrists, as well as a small sack of beans in the palm.

These beans act like a keyboard wrist pad, elevating your palms to the same level as the keyboard. Wearing these gloves feels strange at first, and it takes a while to stop bashing keys randomly with the bean bag section. Gripping the mouse is also a little tricky.

However, the benefits are massive. You'll soon find that aching wrists are a thing of the past after a few days of using these gloves.

If you're a heavy user of the keyboard, you'd do well to invest in a set of these gloves. Gamers probably won't find them so useful though as they can make using the keyboard and mouse a little hard at times.



RD7-CA Cooling After

SUPPLIER: PC Range
www.pcrange.biz
PHONE: (08) 8322 9544
PRICE: \$39

CPUs are getting bloody hot. So hot that within 10 years, based on current CPU technology, a processor will put out the same level of heat as the booster rockets on a space shuttle. It's true.

Hence, we strap oversized chunks of copper to our CPUs – but there's a problem with this. As soon as you power down your PC, the fan on the HSF shuts down, but the CPU will still retain all that heat it has built up while it was in operation. This is also true.

In fact, your CPU temperature can actually rise as soon as you shut down, before slowly cooling to room temperature. This is probably not a good way to ensure that your CPU will last you for years to come.

Enter the RD7CA. This gizmo functions like those turbo timers found on hotted-up cars. When you shut down the PC, the RD7CA keeps feeding juice to the fan on your heatsink.

It can be set to keep it running for one, three, five or 10 minutes – three should do the job nicely, unless you like the brain-killing sound generated by a fan.

Installation is simple – just attach the pass-through cable between your PSU and motherboard, hook up your CPU fan and away you go.



LED 80mm-to-60mm fan adaptor

SUPPLIER: Anyware
www.anyware.com.au
PHONE: (02) 9879 5788
PRICE: \$32

Urgh. Yet another LED product. For the love of light, when will it stop? We swear that the manufacturers of these products won't be happy until they've blinded each and every computer user with their crappy LED products. Shame.

This has to be one of the dodgier LED products around. It wouldn't be so bad – if the LED components were integrated cleanly into the product. Instead there's a large extrusion to one side of the adaptor that houses a small PCB and assorted other components. Buried within this mass of components is a fan speed controller, in case you feel like adjusting the speed. Unfortunately the entire unit looks ugly – Michael Jackson ugly. At least the LED fan grill managed to make the components nice and tidy, a lesson this product needs to learn. Besides this complaint, we're not huge fans of fan adaptors, regardless of how much they burn your retinas. Heatsink efficiency is usually lower, albeit with the benefit of a lower volume fan.

You might have noticed just how much we disliked this product. Yeah, thought so. It'd make a nice gift idea for someone you really, really despise though. . .



Billionton USB Bluetooth adaptor

SUPPLIER: AusPC Market
www.auspcmarket.com.au
PHONE: (02) 9746 0900
PRICE: \$99

Bluetooth is going to take over the world. In the near future, human beings won't have intercourse to procreate – instead we'll just send our genetic information to viable candidates with Bluetooth. It's a much tidier process this way, and the risk of getting AIDS is greatly minimised (until someone figures out how to embed the virus in an executable file).

Tidy sex is great, but a tidy computer is even better. Which is why there is a big push towards Bluetooth peripherals on the PC. There's nothing worse than having your shiny clean gaming den looking like a pig sty thanks to a tangled mess of cables; and no matter how many cable ties you throw at it, it still ends up looking like a suicide bomber has exploded under your desk. Now that we have Bluetooth keyboards, mice, phones, PDAs and networks, getting yourself a Bluetooth adaptor for your PC is quickly becoming an attractive idea.

The Billionton USB Bluetooth adaptor is like every other Bluetooth adaptor on the market, with one small exception – it's a real bargain. At \$99, forking out the cash won't hurt the hip pocket as much as its rivals probably would.



IDE cable EL spiral string light

SUPPLIER: Anyware
www.anyware.com.au
PHONE: (02) 9879 5788
PRICE: \$45

Rounded IDE cables are cool. So are electroluminescent cables. Put the two together and you get a product so damn chillin' that the penguins will be flocking to your case as if it were Antarctica V2.

Your PC will be covered in icicles – it's that darn cool. And that's exactly what this hybrid product is.

Supporting a maximum speed of ATA133, this cable looks just like your standard clear and rounded IDE cable. Until you turn your PC on, and are blown away by the amazing glowy string stuff that is wrapped around the cable. It's kinda like that blue blood found in the veins of cybernetic zombies. We doubt it'll pump out and coat the inside of your case if it explodes though.

Unfortunately the EL lighting requires its own power transformer, hence the inclusion of a Molex connector that hooks up to a little black box to supply the necessary juice.

The cable is 75cm long, which should be adequate for even the most spaced-out of PC case interiors. And if you're worried that the rounded cable will corrupt your data, you've nothing to fear, as this old wife's tale was disproved years ago.



Lian Li fish tank

SUPPLIER: Anyware
www.anyware.com.au
PHONE: (02) 9879 5788
PRICE: \$149

This has to be one of the funkiest products we've checked out in Gearbox. Designed to fit ATX Lian Li cases, it will turn your PC into a virtual aquarium, minus the concern of fish getting stuck in your hard drive or water flooding your PSU.

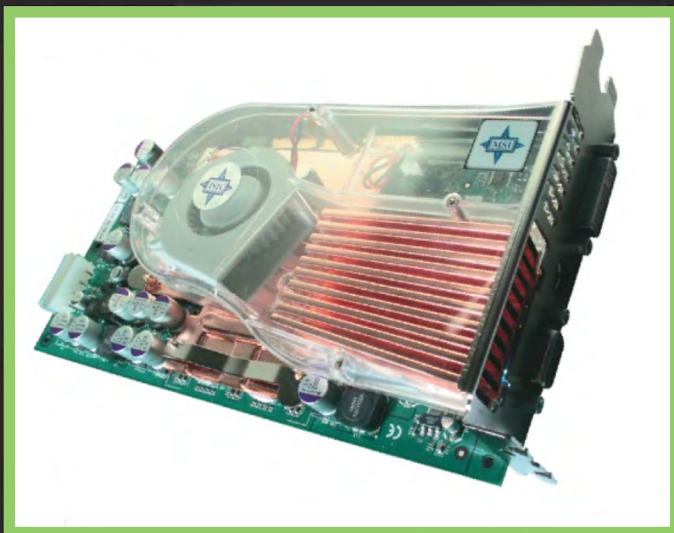
It's basically a new side panel for your Lian Li case, and instead of a simple window, it's actually a small water tank that's 3cm thick. Fill it up with water, chuck in a couple of the fake fish (which have neutral buoyancy, and thus float up and down with the currents in a realistic, fishy manner) and pebbles, hook up the air pump and you're good to go. There's even a cold cathode that lights up the entire tank, just like a real aquarium.

You probably wouldn't want to put actual fish in this panel, as it would be an utter bitch to clean thanks to the mainly sealed nature of the tank, but the fake fish still look very cool. Feel free to stick the real McCoy in there, as long as you've no trouble with a visit from the RSPCA. All that heat. . .

You'll need to be careful not to let the pleasant bubbly noises lull you into a deep sleep while you're waiting for the next round of Counter-Strike to begin.

Cheating without getting caught

IT'S THE MOST HYPED PRODUCT NVIDIA HAS EVER RELEASED, AND A MAJOR MILESTONE FOR THE COMPANY. BUT CAN THE GEFORCE FX BECOME THE NEW 3D CARD OF CHOICE? JOHN GILLOOLY SCREAMS THE ANSWER OVER THE HOWL OF ITS COOLER.



Over the past few years, we've used NVIDIA's six-month product cycle to calibrate our calendars. Without fail, the graphics giant has stuck to this accelerated Moore's Law of development, riding it all the way to number one. But this relentless pace has hit its first huge roadblock in the form of the GeForce FX.

Months after this next generation GPU was announced at Comdex, actual cards are for the most part non-existent. Rumours emerged that NVIDIA was not only controlling all the production of the high-end GeForce FX 5800 Ultra cards, but only 100,000 of the beasts would ever leave TSMC's door. While NVIDIA strongly denies these rumours, word coming from many sources in Taiwan is that the gossip is right on the heatsink.

The reality of this means that it's unlikely we'll see retail cards on the market until April, and then it will still take a while for volumes to appear, and prices to drop to sane levels.

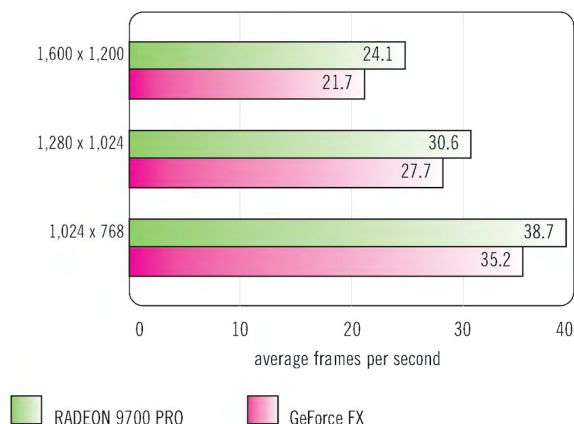
There will be two models of GeForce FX 5800 on the market. Most of the hype so far has been directed at the 500MHz core, 1GHz DDR-II GeForce FX 5800 Ultra model, but reality and product availability means that 99% of cards that we will see will be based on the 400MHz core, 800MHz DDR-II GeForce FX 5800 model.

Rather than twiddle our thumbs, patiently waiting for retail cards, we called in a few favours and scored an MSI GeForce FX 5800 engineering sample. Now, this sucker is a curious beast. Based on the A02 revision GeForce FX Silicon, it uses the gigantic FX-Flow cooler that is required for the Ultra version of the card.

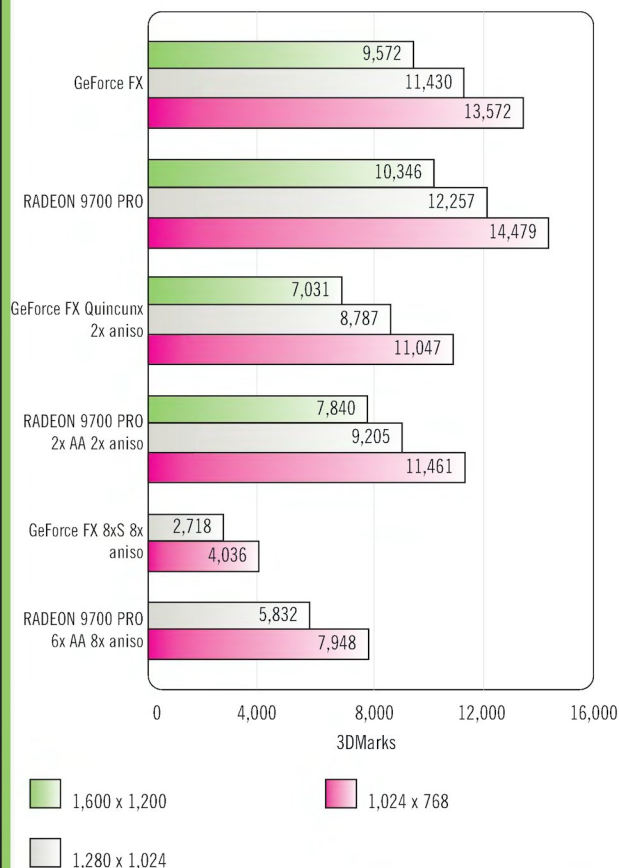
It is unlikely that any of the normal GeForce FX 5800 cards will use these coolers. The slower models will not need such an extreme solution, and using such a meaty contraption would only inflate the costs and make the card needlessly loud. The card will also be made by each company, rather than doled out by NVIDIA, which will make for a much more diverse range of cards, and hopefully, more reasonably-priced solutions.

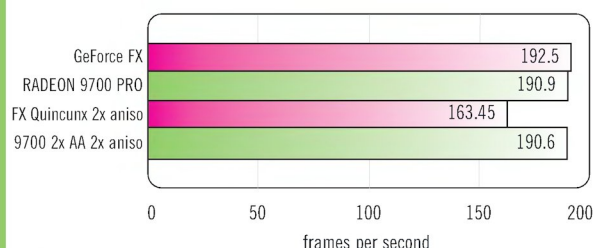
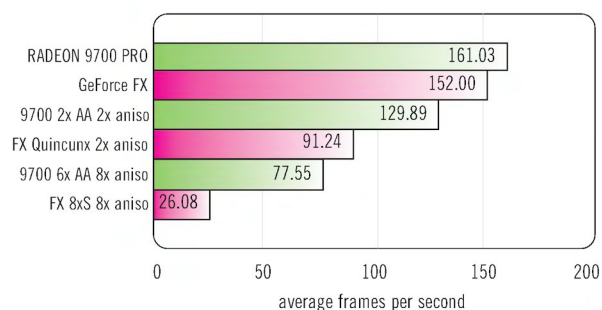
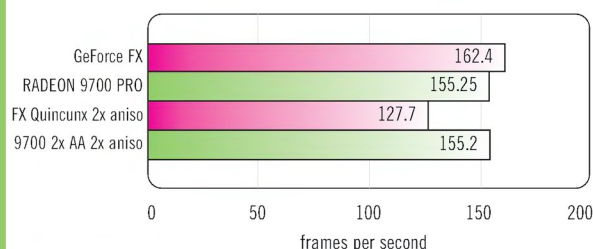
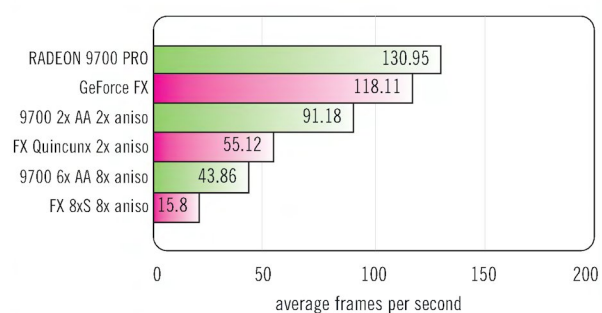
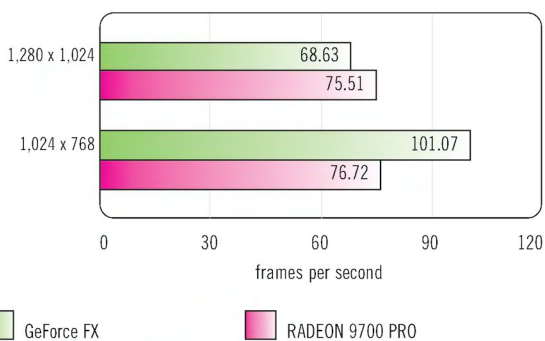
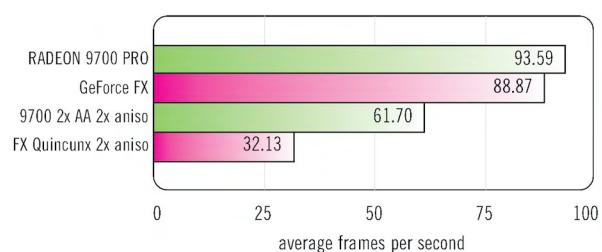
It is fair to say that while the performance of the card is indicative of how the final GeForce FX 5800 will go; the looks will be completely different. Going by our previous experience with early revisions of NVIDIA

Codecreatures Benchmark Pro



3DMark2001SE Pro



Quake 3: Arena – 1,280 x 1,024**UT2003 – 1,024 x 768****Quake 3: Arena – 1,600 x 1,200****UT2003 – 1,280 x 1,024****Dungeon Siege****UT2003 – 1,600 x 1,200**

Silicon, such as the GeForce3, there will undoubtedly be some performance improvements before final Silicon is available, at which point we will have a second look at the retail product.

Our strong interest in the FX 5800 is based around one significant point: memory bandwidth. Competition between 3D chip makers has revolved around what features are supported, and there has usually been a trade-off between different architectures based on this. NVIDIA and 3dfx were historically known for duking it out over the relative benefits of 16- and 32-bit colour, or high-resolution vs. antialiasing. ATI and NVIDIA have for the past couple of years leap-frogged each other with more advanced shading units. However, new features only ever work at speed when they aren't being choked by the memory bus.

With the RADEON 9700 PRO, ATI smashed this barrier for a generation or two by biting the bullet and introducing a complex and expensive-to-implement 256-bit memory bus. It initially pumped the costs of the card up, but as any quick check of pricing will show, this initially high price has dropped down to a very reasonable level.

NVIDIA took a different tack with the memory bandwidth issue, choosing to use the expensive and rare DDR-II memory at 1GHz for its GeForce FX 5800 Ultra card and 800MHz for the GeForce FX 5800. In the case of the 5800 Ultra this translates to memory bandwidth of 16GB/s – for the 5800 it works out at 12.8GB/s. The actual numbers quoted by NVIDIA are greater, 48GB/s for the 5800 Ultra and 25.6GB/s for the 5800.

This is because of the implementation of lossless colour compression through the pipeline. Thanks to the 256-bit memory bus, ATI manages to get a cool 19.4GB/s out of the RADEON 9700 PRO's 620MHz DDR-RAM.

Memory bandwidth is of utmost importance because it's the main influence on video performance under antialiasing and anisotropic filtering. With video hardware at the point where running games at normal settings barely impacts performance, anyone who is looking at these high-end beasts will want to make full use of available image quality enhancers.

Beat that bandwidth

To sort out just what these disparate feature sets and clock speeds do for performance, we lined the MSI GeForce FX 5800 up against a HIS RADEON 9700 PRO. While the GeForce FX 5800 will end up pitched at the non-PRO RADEON 9700, at launch we can expect the GeForce FX 5800 and the RADEON 9700 PRO to be priced in the same arena.

Testing was done using an i845PE motherboard, 3.06GHz Pentium 4 and 1GB DDR-RAM. The software environment was Windows XP Pro with Service Pack 1, DirectX 9, Catalyst 3.1 drivers for the RADEON and Detonator 42.68 drivers for the GeForce FX.

Our first test is the DirectX 9 benchmark, 3DMark03. We have only included a small number of 3DMark03 tests, not only because we are still evaluating the benchmark, but also because the Detonator 42.68 drivers

were supplied for use when benchmarking NVIDIA cards with 3DMark03, and hence may contain optimisations. We tested at normal settings, and then with post-processing, which uses the shaders in the DX 8 and DX 9 tests to add depth-of-field and overbrightening effects. Perhaps the most telling results are the Mother Nature ones. While the GeForce FX sits behind the RADEON in the DX 8 tests, in this pixel shader overload benchmark the FX maintains parity with the RADEON.

With an initial close victory to the FX's shading unit, we pulled out the meatiest of the DX 8 benchmarks, Codecreatures, and ran the cards. Again, the GeForce FX is slightly slower than the RADEON 9700 PRO, but it maintains an even gap as resolution increases.

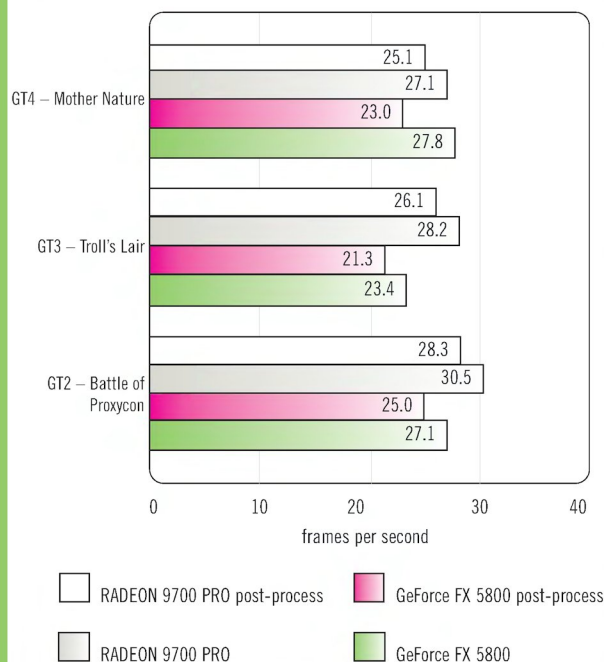
This picture changes dramatically when performance shifts from relying on the shader unit to memory bandwidth. We set up three configurations for testing antialiasing and anisotropic filtering performance: none; 2x AA (Quincunx for the FX) and 2x anisotropic filtering; and the heavy duty maximum settings of 6x AA and 8x anisotropic filtering for the RADEON 9700 and 8xS AA and 8x anisotropic filtering for the GeForce FX.

Our first test with these settings was 3DMark2001SE Pro. Again, while the FX is slower overall than the RADEON 9700 PRO, this margin is not by much. The RADEON 9700 PRO's 256-bit memory bus shows that it has legs over the DDR-II advantage. While both cards show minimal hits with low level image quality enhancers, the FX takes 5-10% more of a hit when the high quality settings are used.

The performance drop when shifting resolutions is shown nicely in Dungeon Siege, a benchmark that has always been kind to NVIDIA hardware. While the FX slaughters the RADEON 9700 PRO at 1,024 x 768, its performance almost halves when resolution is increased, whereas the RADEON 9700 PRO only loses a couple of frames with the increase.

Unreal Tournament 2003 is perhaps the most relevant of the modern game benchmarks. The engine is being licensed extensively and it is certainly the most advanced game engine on the market today. Again we see the GeForce FX struggling. For instance, at 1,024 x 768, the RADEON 9700 PRO's performance drops by 20% when 2x settings are used, the GeForce FX drops by 40%. When the maximum settings are used, the RADEON's performance drops by 40% but the FX's drops by an astounding 70%. This trend continues as the resolution is increased, and it shows the bottleneck caused by the 128-bit memory bus.

3DMark03 tests



Feel the noise

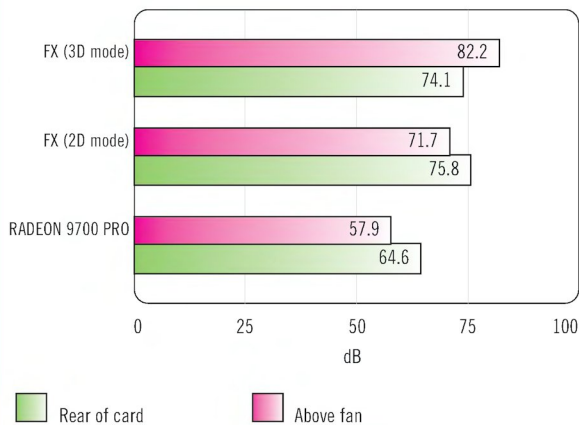
Much has been made of the monstrous FX-Flow cooler that NVIDIA has said is necessary for the GeForce FX. While it's a work of engineering art, and a thing of beauty, it takes two PCI slots out of action on your average motherboard, and it's loud. The cooler works in two modes. For desktop tasks and non-3D gaming it has a low-speed 2D mode in which the core and RAM speeds are throttled back, allowing the fan to run at a reduced speed. It is only when 3D mode kicks in and the clock speeds increase that the cooler ramps from a low hum to a deafening howl.

Rather than just bitch and moan about it, we decided to test just how loud it actually was. So we grabbed our decibel meter, waited until silence descended on the Labs at 3am and ran some tests. We measured the noise level directly next to the fan on the cooler, and then at the rear of the card, pointing the meter at the TV-out port. We ran these tests on the GeForce FX 5800 in both 2D and 3D mode, then compared it to a RADEON 9700 PRO with a stock cooler.

As is clear on the graph, the GeForce FX is incredibly loud. While in 2D mode the noise is bearable apart from a constant level of background whine (it is actually an amazingly effective tinnitus simulator), it is the howl of 3D mode that stirs the primal urges to kill something.

The sheer amount of noise coming out the back of the system smashes that of the RADEON 9700 PRO, especially when you remember that the noise level doubles with every 10dB increase. It is certainly the loudest PC component we have experienced in the Atomic Labs, and we would definitely recommend having a listen to one of these cards before you decide to purchase one. Otherwise you may well go insane.

Noise level



Long term FX

NVIDIA has not really dropped the ball with GeForce FX as some people would say; they have just missed the first half of the match. If the sides were reversed and it was ATI launching the RADEON 9700 PRO into a market occupied for six months by the GeForce FX then ATI would be the one with the uphill battle.

However, the RADEON 9700 PRO does appear to be the more capable card, thanks largely to the 256-bit memory bus, which allows full use of high-quality AA and anisotropic filtering.

Our final answer will have to wait until we have production GeForce FX cards and more mature drivers, but the sterile monopoly of the past few years is well and truly gone, and the 3D battle has just gotten intensely interesting again.

The background of the advertisement features a detailed, artistic rendering of the ASUS V9900 graphics card. The card is shown from a perspective that highlights its various components, including capacitors, heat sinks, and the main GPU chip. Overlaid on this background is a large, stylized eye graphic. The eye has a red iris and is surrounded by various technical specifications and product names. The overall aesthetic is high-tech and futuristic, with a focus on the card's advanced features and performance capabilities.

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DirectX 9.0

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- Up to 3X geometry performance from GeForce4 Ti 4600

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Interview with a visual visionary

ATOMIC TALKS FUTURE 3D TECH WITH NVIDIA'S CHIEF SCIENTIST, DR DAVID KIRK.

Atomic: Intel has told us that PCI-Express will first appear as an AGP replacement and NVIDIA has made public statements of support for the standard. What impact do you see PCI-Express having on 3D hardware?

Dr Kirk: I think PCI-Express is very exciting because AGP has essentially run out of steam with AGP 8x, there is no AGP 16x and, as I said in my presentation, we are trying to reduce the dependence on bandwidth by architecting to take advantage of more computation, but bandwidth still matters. And free bandwidth is still very high but we are still limited by AGP 8x and we can draw small polygons faster than we can transfer them.

Atomic: Will PCI-Express reduce reliance on dedicated GPU memory?

Dr Kirk: The ratio of system memory performance to GPU memory performance has been about a factor of 10 for as long as I have been in the industry. So any time you are willing to give away 90% of your performance you don't have any more reliance on GPU memory. The need for it comes from the fact that the signalling technology in AGP 8x is really at its limits so we are moving to a new level from where we can build. Bandwidth is really important.

Atomic: When PCI-Express is implemented, there will be a wholesale shift to the technology. When will a new generation of cards based on the architecture be announced?

Dr Kirk: It would be nice if the industry would just flip a switch and all change at once but unfortunately I don't think there is ever going to be a step-function transition like that. We will continue to support AGP 8x. Right now we are AGP 8x top-to-bottom and when PCI-Express' introduction comes we will very quickly have top-to-bottom products for PCI-Express and AGP 8x as long as there is interest in the product. For example: we still sell TNT2 and Vanta cards because people still want to buy them. Millions of them a month, that's how much people want to buy them.

Atomic: The main reason cited for the NV30 delay was problems with 0.13-micron technology at TSMC. NVIDIA has always aimed at the most advanced process to push their GPUs to the limit and one-up the competition. This strategy has worked superbly until the NV30, which for the first time has dropped the ball. Is it because TSMC's foundry has second-rate fabrication technology compared to IBM or Intel?

Dr Kirk: I disagree

Atomic: You don't think this is some sort of bottleneck?

Dr Kirk: No. You said 'second-rate'. That I didn't agree with. You are completely wrong.

Atomic: Sony and Toshiba already currently have working libraries for 0.065 SOI processes, while TSMC is struggling at 0.13.

Dr Kirk: Don't confuse marketing with reality. How much silicon are they are actually producing with that? It is perfectly easy to say I have working libraries. It is perfectly easy to say I can manufacture one device that works, but mass production is completely different. I would say that the gap in time between TSMC and the best is only six months.

Atomic: Has NVIDIA looked into gaining higher tech fabrication technologies from process leaders like IBM and Intel?

Dr Kirk: The future is the future, and everything is unpredictable, but TSMC and NVIDIA have had a great partnership and 0.13 as a process, particularly with copper wiring, presented a lot of technical problems for everyone. And again, I don't want to name names, but the very first pioneers who went into production on 0.13 had enormous problems with copper. Everybody had to conquer those problems in different ways

because the design was different, but 0.13 was a big challenge. And that is why I mention that it is easy to say 'Oh yeah, we have libraries for the process' but actually getting it into production and getting good yields – those are hard. The next step after 0.13 is 90 nanometres and it will have different problems and we don't even know what they are yet. You mentioned 65 nanometres – well, there isn't even anybody in production with 90 yet.

Atomic: Far down the track – how do you ultimately see the GPU in five, ten years from now? It's said that everything done in 3D right now is just a hack. Which hacks will remain and which hacks will be replaced with technically correct solutions a decade from now?

Dr Kirk: Well, 3D graphics is all about cheating without getting caught.

Atomic: Will you get better cheating methods?

Dr Kirk: We'll just get better and better hacks. What is happening is the world is simulating radiant light bouncing around and reflecting and all that stuff. It is amazing as nature does it in realtime. And we do a lot of approximations because simulating the amount of photons that are in this room bouncing around, we're not going to have computers that can do that for a long time.

So, we have to take short cuts. So, your question about which hacks are going to remain – one of them where you are going to start seeing a change right away is textures. I think that you are going to see a lot more synthesised and calculated patterns rather than textures, I don't think textures are going to go away, but I think the dependence on textures is going to be reduced.

Atomic: How will the GPU internals look? A massive memory embedded on-chip with large numbers of virtual SIMD arrays perhaps?

Dr Kirk: I think you will have a massive number of processors that are working independently. The architecture will continue to take advantage of the streaming processor architecture where most computation operates on data that is already on the chip most of the time. There are a lot of challenges. We were talking about four or eight pipelines, how about 2,048 pipelines?

How about using those pipelines when you are drawing one particular triangle. Essentially all of Dawn [NVIDIA's flagship GeForce FX demo star] is very small polygons. It would require a lot of changes in architecture to think about – how do you program a 2,000 processor pipeline? I don't know, nobody knows. Those are the problems we have to solve in the architecture.

Atomic: Looking even further down the pipe, and with the current trends of large-scale integration, will the CPU takeover the role of the GPU or vice versa?

Dr Kirk: I think we've shown why the GPU path is going to win. The only way that the CPU can do all this processing just as fast is by becoming a GPU. General-purpose computing is not very hard, how much faster do you need your Excel spreadsheet to go? What you really care about is having high-definition video, and being able to have 3D graphics of better and better quality. Media kinds of things are what GPUs are really good at, those are the things that we want to go faster. How fast do you want your keyboard and mouse processing to go? It's fast enough already.

Atomic: When the first single-die, dual-core CPU/GPU arrives, whose label will it have, Intel's or NVIDIA's?

Dr Kirk: I don't know. The future is hard to predict. I think we'll continue to try and make exciting and compelling products; people don't get passionate about a CPU but will get very excited about a GPU.



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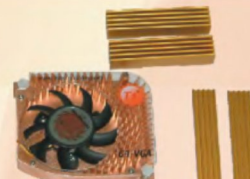
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Sonic Boom

IT'S TIME TO BOOM, BOOM, SHAKE, SHAKE THE ROOM WITH *ATOMIC*'S RESIDENT MUSIC MAESTRO, BENNETT RING. AND HE'S GOT A FEW SHOCKING SURPRISES IN STORE FOR THE EAX LOVERS OF THE WORLD.

When discussing which PC components affect frame rates, the most commonly talked about bits are the CPU, video card and memory. However – and it's a little known fact – sound cards can have a profound effect on the overall chuginess of your games, especially when you start enabling cool echoey stuff like EAX. With the recent release of 3DMark03 and its sound benchmark, we thought it might be a great time to take a look at the more popular sound cards available. This benchmark runs the Wings of Fury scene from the graphics test of 3DMark03, first with zero sound, then with 24 different sound sources, and finally with an ear-splitting 60 sounds – not that many of today's sound cards can actually run 60 sounds in hardware at one time, but hell.

Unfortunately, it doesn't include EAX support. So we've been scouring for a decent EAX benchmark ever since the Soundblaster Live! brought the joy of EAX to our ears. More observant gamers have noticed that EAX can bring frame rates plummeting, so you can imagine our joy when Creative finally told us of a benchmarking application that uses full EAX – Dungeon Siege. This little pearler has been gathering dust in our benchmarking shelf for around a year, but it's only now that we have discovered that it is a great EAX benchmark.

It only supports EAX version 1, but it's still a great application

for showing how well a given sound card supports the most popular set of special audio effects. We also used ye olde faithful Audio Bench's DirectSound benchmark. We selected the most stressful bit, the 44.1KHz; 32-voice; 16-bit streaming test, which reports how much of your CPU is getting chewed while the benchmark is running. Obviously the lower the percentage reported, the better.

Sound quality tests were probably the easiest part of the testing. After chatting to several sound engineers about which gadget we'd need to steal to accurately measure the sound quality of each card, they convinced us that listening tests were the best way to do it. Numbers are one thing, but at the end of the day it's all about how good it sounds to human ears. And after listening to all of these cards, it soon became crystal clear which offered the highest fidelity audio.

The tests were conducted on a P4 2.4GHz, i845PE, Ti4800 system with Sennheiser headphones, to limit bottlenecking in other areas of the system. Windows XP with DX 9 was our OS of choice. So, let's see which of today's sound cards offer the best performance and sound quality for your PC. We've ranked them from worst to best, making it simple to choose the right card for your needs. You might be surprised to see just how much of a difference a fast sound card can make to the smoothness of your gameplay.



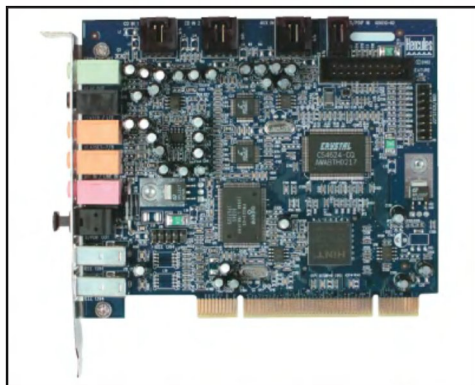
Terratec DMX 6fire

WEBSITE: Terratec www.terratec.com

SUPPLIER: Major Music www.majormusic.com.au **PRICE:** \$699

The only alternative to the Audigy series that offers 24-bit/96KHz sound, the 6fire stands out for having brilliant sound quality. Unfortunately, it also stands out as having by far the most problems with our benchmarks. It simply refused to run on 3DMark03, didn't support EAX in Dungeon Siege, but thankfully we did manage to get it to complete the Audio Bench test. It might have been better for Terratec if it didn't, as it scored the worst performance of the lot, devouring a massive 13% of the CPU's resources.

This is obviously not a great sound card for gamers, due to its compatibility issues and high CPU cycle suckage, which is a pity considering how nice it sounds. Musicians might like to take another look, but it's not useful for games.



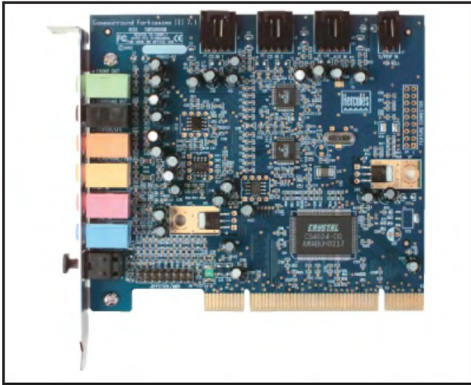
Hercules Digifire 7.1

WEBSITE: Hercules www.hercules.com

SUPPLIER: Hercules www.hercules.com **PRICE:** \$190

How on earth anyone can fit a 7.1 speaker system around their PC is beyond us, but for those who somehow manage this work of audio wizardry, the Digifire 7.1 is one of the few sound cards that support a speaker stockpile of this size. The inclusion of two FireWire ports is pretty nifty, as is the optical S/PDIF output, but these features aren't exactly revolutionary anymore.

Sadly the sound quality of this card is lacking, being measurably inferior to the better performers. It seemed fine at first, until we fired up the 24-bit/96KHz cards and were promptly blown away by the crispness of their audio. Its performance in 3DMark03 was one of the fastest at 24 voices, but had fairly nasty results when it came to EAX.



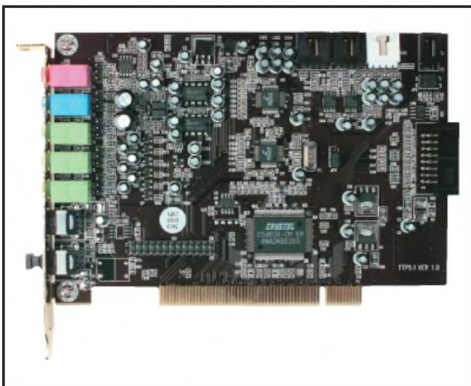
Hercules Gamesurround Fortissimo III 7.1

WEBSITE: Hercules www.hercules.com

SUPPLIER: Hercules www.hercules.com **PRICE:** \$130

There isn't a lot of difference between this sound card and its Hercules stablemate, the Digifire 7.1. Both support 7.1 speaker setups, as you've probably already guessed from the product name. Both have lower sound quality than the 24-bit/96KHz sound cards, albeit at a much more affordable price than the uber high-end sound cards.

Like its brethren, this card could not complete the 60-voice test in 3DMark03 but did very well in the 24-voice test. Strangely this excellent performance failed to carry over to any of the other benchmarks. In fact, this card performed almost identically to the Digifire 7.1 in all of the benchmarks. It had the second slowest EAX framerate, and also chewed up almost 9% of the CPU's resources.



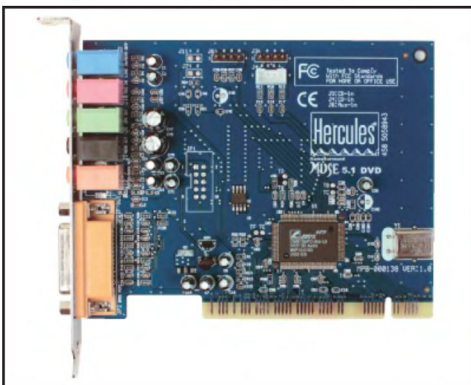
Videologic SonicExplosion DVD

WEBSITE: VideoLogic www.videologic.com

SUPPLIER: WESTAN www.westan.com.au **PRICE:** \$279

By the time we tested this card, we had begun to notice a worrying trend – if a sound card is based around a Cirrus Logic DSP, chances are it's not going to be anything remarkable. So when we discovered that this sound card uses the Cirrus Logic CS4630, we weren't holding our breath in the hopes that this might be an Audigy slayer. Thank God we didn't, otherwise we'd all be dead from asphyxiation right about now.

Sound quality was on a par with the two previous Hercules sound cards – not shocking, but not mind blowing either. Surprisingly it managed to complete all of the 3DMark03 sound tests, including the strenuous 60-voice test, and it was only a couple of frames behind the best cards in the roundup.



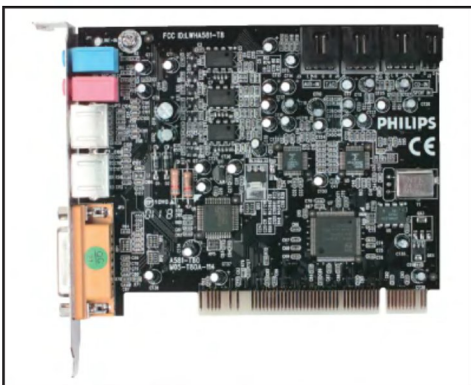
Hercules Muse 5.1 DVD

WEBSITE: Hercules www.hercules.com

SUPPLIER: Hercules www.hercules.com **PRICE:** \$90

The Muse line of cards has been around for a while now, and the latest incarnation drags the series into the world of 5.1 sound. Like its predecessors, the new Muse offers remarkable bang for your buck, but it is sadly lacking some of the fancier I/O options of its more expensive relatives. No S/PDIF to see here folks – its basic stereo outputs all the way.

Unlike the other Hercules cards in the roundup, the Muse uses a C-Media DSP, the CMI-8738 LX. And it's not a bad DSP, especially considering the bargain basement price. Unfortunately this card had issues with the 3DMark03, showing up as being unsupported by the benchmark, hence the lack of any 3DMark03 scores in the graphs.



Philips Acoustic Edge

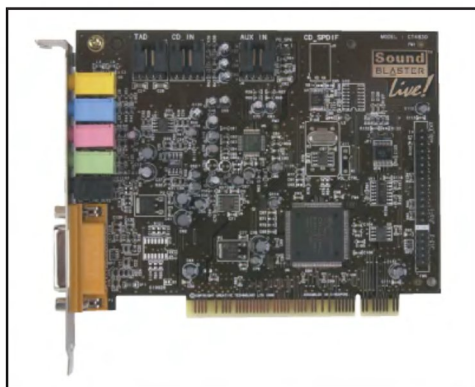
WEBSITE: Philips www.pcsound.philips.com

SUPPLIER: Philips www.philips.com.au **PRICE:** \$299

We can remember the day the Acoustic Edge first hit our labs last year, when we finally thought we were going to see a card that would smoke Creative's finest. Hey, we're not always right. . .

Considering the higher price, we would have expected this card to sound a little better than the Muse 5.1 DVD. Wrong. Oh well, at least the Acoustic Edge has S/PDIF inputs and outputs.

Like the majority of the cards in the roundup, the Acoustic Edge couldn't run the 60-voice test in 3DMark03, yet it performed close to the competition in the other 3DMark03 tests. When it came to EAX performance this sound card reached an admirable frame rate of 47.7 frames per second.



Creative SoundBlaster Live!

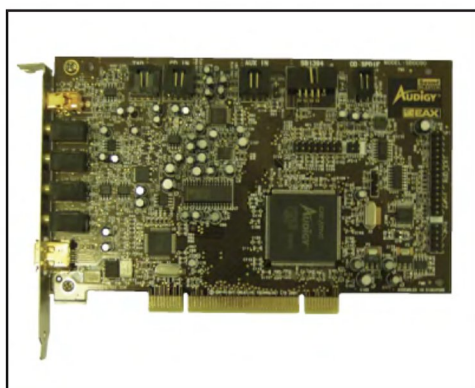
WEBSITE: Creative www.soundblaster.com

SUPPLIER: Creative www.soundblaster.com **PRICE:** \$99

Who would have ever thought that one day we'd be able to purchase a Live! card for less than a hundred bucks? Well that day has finally arrived, and as a result the Live! now offers remarkable value for money.

While the Live! used to be the benchmark for game sound quality, it has since been surpassed by the 24-bit/96KHz cards – and by quite a large margin. It's still a nice sounding card, just don't expect it to come close to the Audigy or Terratec models.

The Live! was a speedy DSP when it was launched, and it's still got what it takes to stick it to most of the competition. It's 3DMark03 result left a little to be desired, but EAX performance was almost as fast as the Audigy 2.



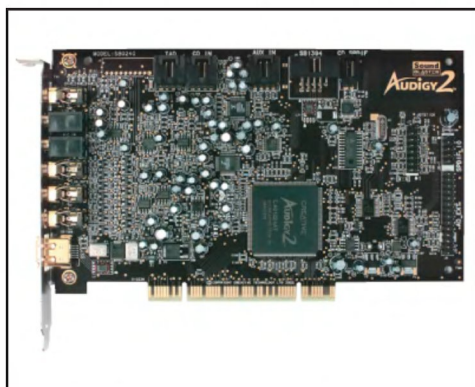
Creative Audigy

WEBSITE: Creative www.soundblaster.com

SUPPLIER: Creative www.soundblaster.com **PRICE:** \$199

There are several key differences between the Audigy and the Audigy 2. First off, it has 16-bit recording as opposed to the Audigy 2's 24-bit, which most gamers aren't going to notice. The Audigy 1 also only supports a 5.1 speaker setup rather than the 6.1 of the Audigy 2. Finally, and it's another feature that will also only appeal to audiophiles, is the Audigy 2's support for DVD Audio, which is lacking in the original.

Other than these differences, the two cards are basically identical. The Audigy has the brilliant sound quality of the Audigy 2, at only half the cost. Performance is equally stunning, as our benchmarks attest. And although it couldn't complete the 60 voices in 3DMark03, it had no problems with the EAX test.



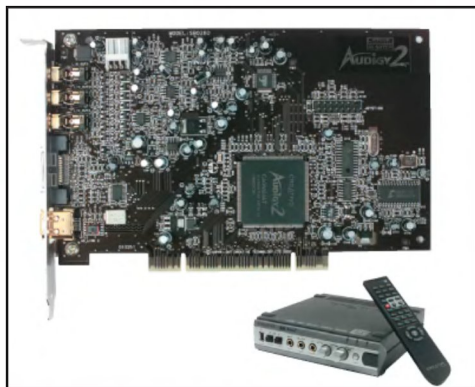
Creative Audigy 2 Platinum

WEBSITE: Creative www.creative.com

SUPPLIER: Creative www.creative.com **PRICE:** \$549

Welcome to the king of today's PC sound cards. It's the grand daddy, the chieftain, the head honcho, and yes, it's a Creative product. Surprise, surprise. Thanks to its 24-bit/96KHz sound quality, you won't find a better sounding gaming card. We didn't think there'd be much of a difference from the Live! sound levels of the past, but as soon as we fired up this card the improvement in sound quality rocked our ear drums. It's not even as simple as saying it just sounds better – it actually *feels* better. Yes, that's weird, but it's all about vibrating skulls and jawbones. Ask a sound engineer for a proper explanation. Take it from us, you will notice the difference.

Needless to say, the performance of this card was absolutely phenomenal.



Creative Audigy 2 Ex

WEBSITE: Creative www.creative.com

SUPPLIER: Creative www.creative.com **PRICE:** \$599

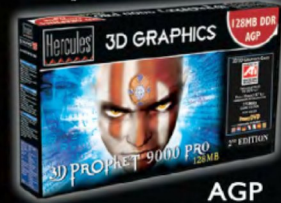
Based around the same card as the Audigy 2 Platinum, the Ex version ships with an extra I/O box that offers you a level of connectivity rivalled only by the 6fire. Thanks to the uber sound card that it uses, it's far superior to the 6fire as a gaming card.

All results for the Ex were identical to the vanilla Audigy 2 Platinum, with a small amount of variance that was expected due to the variance in benchmarks. So let's talk about some of the kick-arse features offered by the Ex, shall we? There's Advanced HD, which is a beefy version of EAX. Not good enough? How does DVD Audio sound to you?

And yes, it is a vastly superior listening experience to CD Audio. . .

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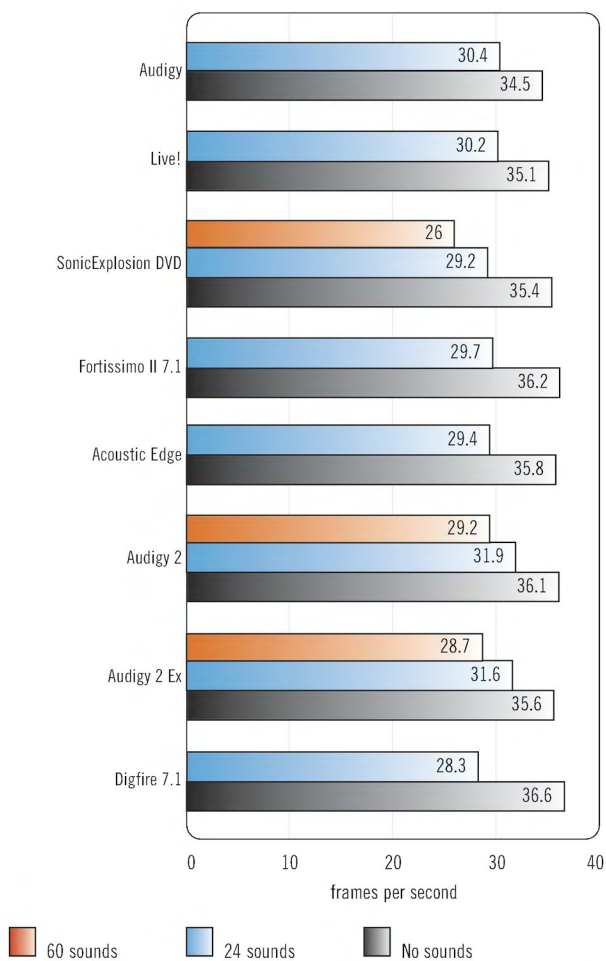
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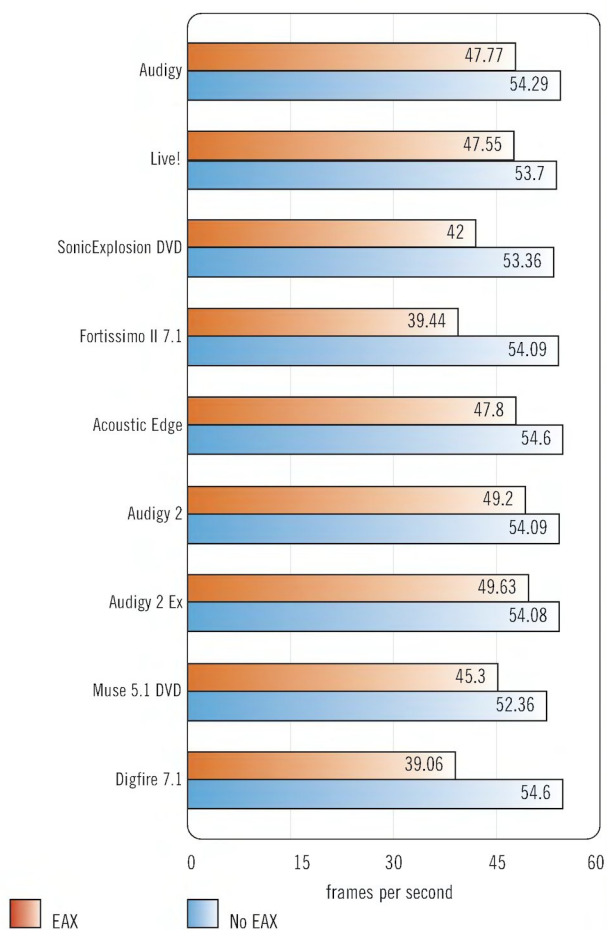


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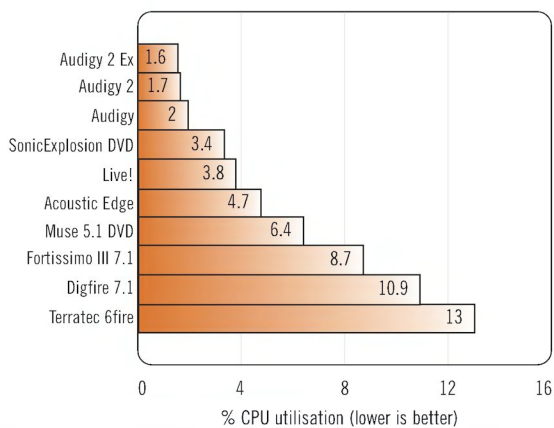
3DMark03 sound test



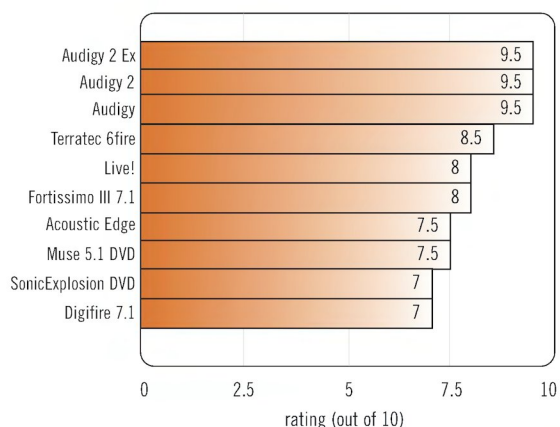
Dungeon Seige – EAX test



Winbench Audio Bench



Sound quality



As you can see, most of the sound cards were tightly grouped in the 3DMark03 sound benchmark results. Because of this, we're not convinced this is a great audio benchmark. Expect its relevance to increase as sound cards supporting 60 voices in hardware become more popular. The two benchmarks that offer the most interesting results are Audio Bench and Dungeon Siege – there's a massive

difference between the CPU utilisation of the slowest (Terratec 6fire) and fastest (Audigy 2 Ex) cards.

With the EAX results of Dungeon Siege, some cards lose a massive 15 frames per second when its enabled, while others only dropped by five. When you consider that this is out of approximately 55 frames per second, you'll quickly appreciate the difference that a fast sound card can make.

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GIGAHERTZ PROCESSORS - EXTRACTING BANG FOR THE BUCK

GIGAHERTZ CHIPS HAVE TRANSFORMED THE GAMING SCENE. IN THIS MONTH'S FEATURE DR CARLO KOPP EXPLAINS HOW TO EXTRACT THE BIGGEST BANG FOR YOUR EXPENDED DOLLAR.

As Atomicans appreciate, the emergence of processor chips with clock speeds in excess of a gigahertz has been a major advance for the gaming community. There is no doubt that chips with multiple GHz clocks provide an unprecedented gain in the performance potential of consumer systems, and thus gaming applications.

That said, *actual* computer performance is distinct from *performance potential*, as poor design and implementation of applications, operating systems and motherboards may see even gigahertz-class processors yield little return in achieved performance against their siblings of a half decade ago.

In this month's issue, *Atomic* will explore what is stopping us from getting the full performance potential of this generation of processors, and discuss what strategies a gamer can pursue to extract as much bang as possible from the available bucks.

BIRTH OF THE GIGAHERTZ PROCESSORS

The biggest breakthrough contributing to the breaking of the 1GHz clock speed barrier was the introduction, in 2000/2001, of Copper metallisation fab technology. After many years of research IBM cracked the problem of how to replace Aluminium, the mainstay until then of on-chip wiring. More conductive Copper reduces series resistance in the wiring on the chip, in turn reducing signal delay effects.

The first processor to use this technology was AMD's K7/Athlon, followed by the Pentium 4. Most mainstream chip manufacturers have shifted to Copper since then.

A microprocessor in this class will have tens of millions of transistors on chip, clock speeds between 1.7 and 3.06GHz (this year) and a six to nine-way superscalar architecture incorporating capabilities such as speculative execution and out-of-order execution. More than likely, a four to eight-way set associative L2 cache of up to 512KB will be integrated on the chip die, as well as a split L1 cache of up to 128KB.

The machine is likely to be using a 64-bit or wider system bus to main memory running at a clock speed between 100 to 533MHz, depending on the chipset in use.

By any measure, such machines have formidable performance potential if properly exploited. As performance scales in part with clock speed, but also with the degree of superscalarity in the CPU and the hit ratio of the CPU caches, for many applications such chips should yield performance gains greater than the ratio of its clock speed against the clock speed of a sub-1GHz chip of similar architecture.

Careful examination of published benchmarks suggests otherwise, with the scaling in benchmark figures with clock speed ratios falling short of the ideal N-fold improvement in performance.

To an observer not well versed in machine architecture, this seeming incongruity might appear to be puzzling. To understand why this is, we must delve a little deeper.

IMPEDIMENTS TO PERFORMANCE

Let us assume an ideal world – a dangerous but useful form of speculation. In this world the application and operating system are always resident in the CPU's internal on-chip caches, and the binary executable code created by the compiler is dominated by instructions that are not mutually dependent.

In this ideal world, the processor will chew through the stream of instructions in the application at its peak achievable throughput almost all of the time. Of the N execution units inside the superscalar CPU, nearly all of the N will be active all of the time.

As the application is always resident in the cache, in this ideal model every instruction fetch sees the nanosecond class access time of the cache, rather than the tens of nanosecond access times of the main memory. Therefore, the CPU sees an uninterrupted stream of instructions and is never stalled for instructions to process.

Reality, however, might be very different. Superscalar architectures (eg. P4, Athlon, PowerPC) can execute at peak output only when the code they are executing contains few instructions with mutual dependency. Whenever an instruction is dependent upon the results of a previous instruction, there is potential for performance to be lost. 'Instruction Level Parallelism' or ILP is the term used to describe the property of executable code, whereby little mutual dependency exists between instructions.

A particularly troublesome situation for superscalar processors is conditional branching, as waiting for the outcome of a branch has the potential to empty the internal pipelines in the CPU, incurring significant latency times to refill.

Modern processors contain numerous design features aimed at exploiting ILP and also avoiding stalls.

Speculative execution is perhaps the most popular technique in modern processors. At the cost of considerable complexity in logic, supportable due to the large transistor counts available, the CPU will prefetch and execute both outcomes of the branch instruction and discard the outcome that is not used. The difficulty with speculative execution is that the problem becomes intractable where consecutive branches are found.

Consider a piece of code in which four or five branches are nested. The first branch statement results in two paths to speculatively execute. Each consecutive branch doubles the number of instruction streams, from two to four, four to eight and so on. The logic handling speculative execution must prefetch instructions for each of these streams. This imposes limits on how far the CPU can 'look ahead' into the code and speculatively execute. Once that limit is hit, the CPU stalls waiting for the resolution to the pending branch operation.

The difficulty with the ILP problem is that mutual dependency between operands in instructions is often implicit within the algorithm being used. Therefore no amount of compiler optimisation or other clever trickery can beat the problem.

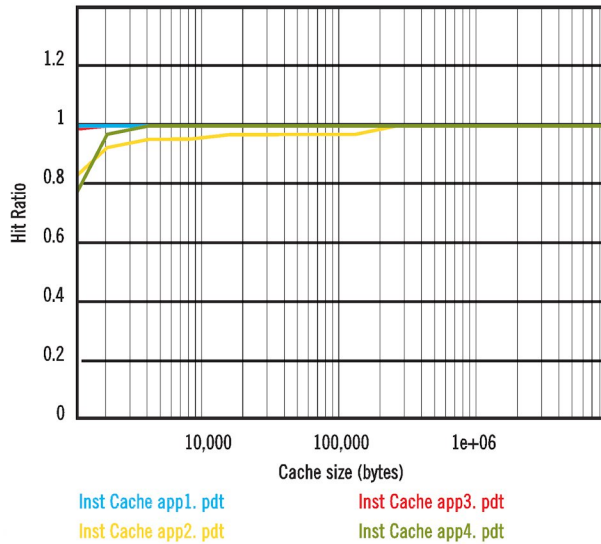
Within any 'soup' of instructions found in a binary module, there will be threads of instructions with mutual dependency, and these in effect form critical timing paths for the algorithms being used. The problem is fundamentally the same as the critical path problem seen in any PERT chart.

The issue of cache performance is no less daunting with a very fast CPU. The aim of all CPU caches, be they combined data/instruction caches, or Harvard architecture / split caches with dedicated data and instruction paths, is to hide the poor performance of the main memory. If the instruction or data is resident in the cache, it can be accessed within a clock cycle or two, if not, then the CPU has to wait for the data or instruction to be found in the main memory.

The classical metric of cache performance is the 'hit ratio', or the ratio of cache accesses, which find the data or instruction in the cache, to the total number of accesses. A cache design that matches a program well will deliver hit ratios well above 90%.

Machine architects like to use a simple metric for measuring the impact of cache hit ratio, the 'average memory access time'. This time is calculated by adding the proportion of 'hits' times cache access time, to the proportion of 'misses' times main memory access time. The higher the hit ratio, the closer the 'average memory

Instruction cache hit ratios SPEC92



ABOVE: This plot is for a simulated machine architecture, which uses a progressively larger Harvard L1 instruction cache.

access time' is to the desired (short) cache access time.

A good example might be a 500MHz CPU, which uses a two-nanosecond cache and a 50-nanosecond main memory. If the cache hit ratio is 99%, then the 'average memory access time' comes in at 2.48 nanoseconds. Even a 1% 'miss ratio' results in a 24% performance loss against the ideal 100% hit ratio situation.

If the hit ratio is further degraded, say to 50%, then the 'average memory access time' becomes 26 nanoseconds. This is a 13-fold increase against the ideal 100% hit ratio situation.

The interesting point then becomes that of what it is costing in 'real' terms. If we assume the CPU can execute an instruction in two nanoseconds average time, then in 50 nanoseconds that CPU did not execute 25 instructions, while it was waiting for the stalled fetch to be resolved.

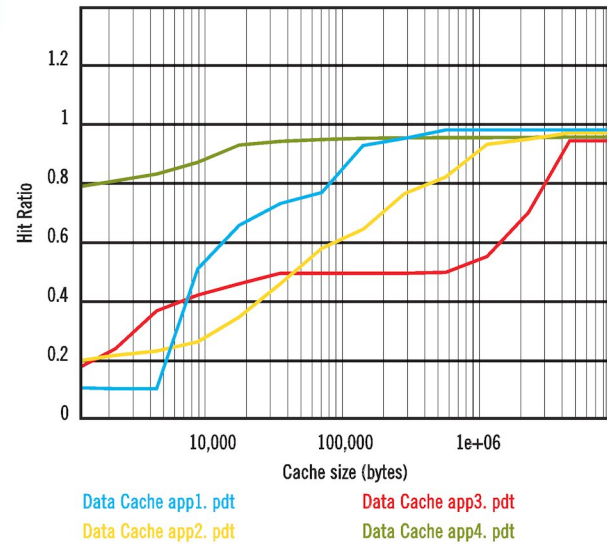
What then happens if the CPU is a genuine 'GHz class processor' with a clock speed of 3.0GHz, but the same order of magnitude 50-nanosecond main memory? The cache access time is much shorter, at 330-pico-seconds or 0.33-nanoseconds. With every stall resulting from a cache miss, the CPU idles while 152 instructions are not executed.

While the issue of ILP is important for gigahertz processors, the performance of the cache architecture is a 'do-or-die' issue.

The problem of speed disparity between caches and main memories will only get worse over time. This is because the economic driver in the DRAM market is density rather than speed. Moore's Law being what it is, we see CPU clock speeds and thus cache speeds increasing by a factor of about ten every decade. Yet over the last decade we have seen DRAM speeds increase roughly by a factor of 2-3.

Around 1990, a typical 'hot' CPU ran at 50MHz and DRAMs had typically around 70-nanosecond access times, yielding a ratio of about 3.5 for typical commodity hardware. In 2003, a typical 'hot' CPU runs at 3.05GHz

Data cache hit ratios SPEC92



ABOVE: This plot is also for a simulated machine architecture, which uses a progressively larger Harvard L1 data cache.

yet commodity DRAMs have typical access times of 25-50 nanoseconds, yielding a ratio of about 75-150.

Therefore the disparity between cache and DRAM speeds has grown by a factor of 21 to 43 times.

Some confusion may result from contemporary marketing terminology surrounding the use of newer technology 'synchronous' SDRAMs. Such DRAMs are designed for burst mode operation, where the access time for consecutive locations in the burst is typically between seven and 12 nanoseconds for current technology. However, the snag is the initial latency in the SDRAM access, which is still somewhere between 30 to 50 nanoseconds for commodity hardware.

If the CPU has experienced a cache miss and is stalled, then it does indeed have to wait the full 30-50 nanoseconds before the main memory responds. This is the nature of a cache miss.

Many tricks are used in modern architectures to avoid misses, and the whole idea of SDRAM techniques is to exploit smart CPUs, which will prefetch instructions and try to perform speculative execution. The idea is of course to pipeline the main memory so that it is busy fetching instructions all of the time.

However, if the prefetch logic doesn't know where to prefetch from, for instance as a result of the 'multiple branch' scenario saturating the speculative execution control logic, then the cache cannot be prefilled and a cache miss will indeed arise.

The basic conclusion to be drawn here is that the 'cost' of a cache miss will continue to increase over time as Moore's Law continues to drive CPUs along their much steeper performance growth curve. Overclocking will exacerbate this problem.

BEATING THE CACHE/DRAM DISPARITY PROBLEM

In recent times, competitive pressures in the commodity computer market have seen big improvements in the architecture of x86 instruction set systems, in effect nullifying much of the traditional advantage held by Unix workstations.

During most of the 1990s, x86 systems could usually match the clock speeds of the contemporary RISC Unix machines, but were typically installed in motherboards with fairly primitive memory and system bus architectures. Therefore regardless of cache performance, the achievable bandwidth to memory was an ongoing problem for x86 systems. By the end of the 1990s, AMD had licensed the DEC/Compaq bus developed for the Alpha Unix workstation and Intel soon after released its equivalent 400-533MHz bus in P4-based systems. Therefore in basic PCs, the performance issues will be firmly centred on the achievable cache hit ratio performance.

Cache architectures have also seen serious improvements over the last few years, in a large part due to the availability of more transistors on the chip die. The biggest single step in the x86 market was the last generation of the Pentium III series, which incorporated an on-chip 256KB eight-way set associative L2 cache with a full speed

256-bit wide bus between the L2 cache and the CPU/L1 cache. This became the benchmark for later CPUs.

Cache hit ratio is a very complex function of the cache architecture and how it interacts with the program being executed. A machine architect has three basic parameters to play with:

- Cache size;
- Cache set associativity, or how many sets of instructions with like low order address bits can be held; and
- Cache architecture, whether it is shared between data and instructions or split into dedicated instruction and data caches.

What we see in commodity products is usually some balanced trade-off between these items to maximise the performance of the design against benchmark programs such as SpecMarks, SYSmarks and others. A clever designer will identify which benchmarks are most representative of market needs and bias design in that direction.

A serious gamer is therefore largely exposed to what the chipmaker's marketers believe to be the most suitable benchmarks. If the application being developed doesn't fit the 'market template' for that CPU design, the odds are that the full performance potential will not be exploited.

There is still some choice left in the market, in that many CPUs can be bought with different L2 or L3 cache sizes. Server or power user optimised CPU variants may be available with 1.0, 2.0 or even 4.0 – 8.0MB-sized caches. Intel Xeon series chips are typical: current variants on offer share a 512KB L2 cache, but may have no L3 cache, or 1MB or 2MB L3 caches.

The simplest approach for a gamer is to benchmark the game/operating system against a range of CPU variants and identify those which don't perform. Assuming all else is the same, the smallest cache size of the machines that perform well will be the cache size that fits the application well.

For vendors of gaming platforms who are in the position to specify a target platform or CPU type and identify the application, this model is practical and simple.

OPTIMISING GAMING APPLICATIONS TO CACHE SIZES

In a given range of CPUs, it's not difficult to visit the vendor's Website and establish what the cache architectures of the respective CPUs are:

- What are the respective sizes of the L1 data and instruction caches?
- What are the respective sizes of the L2 data and instruction caches or the L2 combined cache? and
- What are the respective sizes of the L3 data and instruction caches or the L3 combined cache?

Knowing these parameters for a range of CPUs, it is feasible to pick the lowest common denominator – the smallest L1 data and instruction cache size, and the smallest L2/L3 cache size.

Most applications will spend much of their running time in a large event loop, scanning for inputs and then executing code modules that respond to these inputs. With suitable profiling tools and a bit of common sense, it is feasible to establish what proportion of time the application spends in which specific modules of the application.

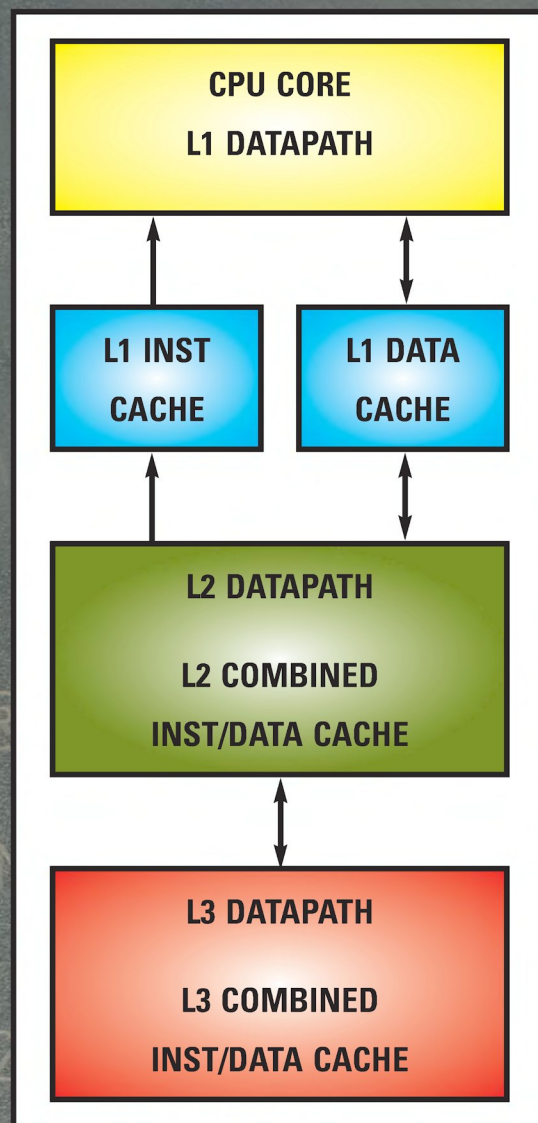
Once this is known, the game developer can try to identify which modules are run most frequently, and how large their executable code, data and stack segments are. If the application is to achieve a high cache hit ratio, the code, data and stack segments must all be resident in the L1, L2 and L3 caches. Therefore to get best achievable performance, the most frequently executed modules should be cache resident. A poor cache hit ratio in an infrequently run code module may verge on the irrelevant. Conversely, a library routine that is being hammered in every pass of one or more loops should have a good hit ratio.

The game developer's aim at this stage is exploratory: identifying which parts of the application are frequently run and likely to be mismatched to the cache.

A good example might be a status table on the heap or at the beginning of the stack. If it is known to be much larger than the L1 data cache or even the L2 cache, and it is very frequently accessed, the prospects are very good that it will experience a poor hit ratio. How poor a hit ratio will really depend upon the locality of accesses.

A similar argument can be applied to a code segment. If that code segment comprises a fairly large loop, and is clearly much larger than the L1 data cache or even the L2 or L3 cache, the prospects are very good that it will become a performance killer.

Is there any reason why a large loop cannot be split into a series of shorter loops, each working on some part of the problem? Smaller loops that fit into the caches will do the same work faster than a large loop that continues to overwrite itself in the cache.



ABOVE: Most modern CPUs use a variation of a two level cache – a split Harvard L1 cache/combined L2 cache.

Is it necessary that the data set be held in an enormous array, if it can be split into a larger number of smaller arrays, each of which fits easily into the caches?

Clearly, this can be a tedious and time consuming chore, especially if an existing application is to be hacked into something that performs better.

Applying such a strategy intelligently will matter, because only those chunks of code and data executed very frequently will return a good payoff in expended effort for performance gains seen.

A final cautionary note is that shrink-wrapped libraries or operating systems with built in cache hit ratio problems are likely to frustrate even the most intelligent tuning effort.

Sceptics might consider a simple example: a (cache) simulation that ran much faster on a 180MHz Pentium Pro than a 400MHz Celeron, despite each using a virtually identical core microarchitecture. Similar tests comparing Xeons versus Celerons, and Athlon XPs versus Durons will yield similar results.

The punchline for dedicated gamers and hardcore overclockers? A better cache architecture might provide a lot more bang than a simple winding up of the megahertz can ever hope to.

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ATHLONS, ALL-ABOARD!

BRINGING OUT THE COWBOY PANTS AND RIDING SPURS, JOHN GILLOOLY'S ROUNDED UP A HERD OF ATHLON MOTHERBOARDS AND GIVEN THEM A GOOD *ATOMIC* BRANDING. AND HERE YOU'LL GET TO SEE WHICH ONES GRINNED AND TOOK THE PAIN, AND WHICH RAN CRYING HOME TO MAMA. YEE-HA!

It's interesting to see how far things have come in twelve months. At the start of 2002 everyone would have said that AMD had a stranglehold on the enthusiast market, riding high on the success of the Thunderbird and Palomino cores. But the passing year saw Intel grab back a big chunk as the Pentium 4 finally matured into a serious competitor and threw off the shackles of RDRAM.

This should have been a short term worry, as AMD was due to unleash its much hyped x86-64 architecture (codenamed Hammer), in the form of the Athlon 64 late 2002. However the date for launch of the Athlon 64 has slipped by almost a twelve months, and it now appears that the earliest chance we will get to cram one of these suckers in our PCs will be this September.

In the interim, AMD has finally released the Barton core for the Athlon XP. While essentially the same as the 0.13-micron Thoroughbred cores, Barton ups the L2 cache from 256KB to 512KB, making the Athlon XP's total 640KB of cache the most currently available on a desktop CPU (the Pentium 4 Northwood core has 512KB L2 cache but a minute amount of L1), at least until Intel's next generation Prescott Pentium 4 core, which will have a cool 1MB of L2 cache.

There have been two reasons touted for the delay of the Athlon 64, the main one being the need to wait for Microsoft to release a 64-bit version of Windows that supports x86-64, and the second is that the Barton core performs well enough to take up the interim slack. There are most likely other reasons for the delay, related to the types of memory supported by the on-die memory controller and the inevitable yield problems that are experienced with new architecture, and fabrication methods like Silicon-On-Insulator (SOI).

Last year, the spotlight was on the turbo-charged release schedule of Intel chipsets, with every three months or so bringing with it a new generation of i845 chipset, with very little movement on the Athlon front. However things have changed, even if it has taken a while. *Atomic* first tried to organise an Athlon motherboard

roundup when nForce2 was announced many months ago, but it has taken awhile for companies to get with this chipset. Alongside this were initial concerns with memory support on the VIA KT400 chipset, which launched amidst confusion over the DDR400 spec. VIA is remedying this in the soon-to-be-released KT400A chipset, which will have rejigged DDR400 support and some small Southbridge additions.

The recent release of the Barton core, in combination with these chipsets, means that a whole new generation of Athlon platforms has arisen, with three new Northbridge/Southbridge combos making an appearance.

nForce2

NVIDIA's second foray into the chipset market has been nothing short of a success so far. While even NVIDIA admitted to the original nForce being mainly a test of the chipset waters, nForce2 has hit with a big bang, accompanied by a much wider range of motherboard partners than its predecessor. The reason for the popularity is a combination of performance and features.

nForce2 is currently the performance champion for the Athlon XP, delivering quicker performance than the competing VIA KT400 and SIS 746FX chipsets. It also has one of the best feature sets on the market, with dual-channel DDR, support for IEEE 1394, USB 2.0, AGP 8x, two onboard Ethernet connections, Dolby-certified 5.1 surround sound and Integrated GeForce4 MX graphics. All this makes one heck of a chipset that is light years ahead of the competition. nForce2 has been built around AMD's HyperTransport technology, which is used for inter-chip communication.

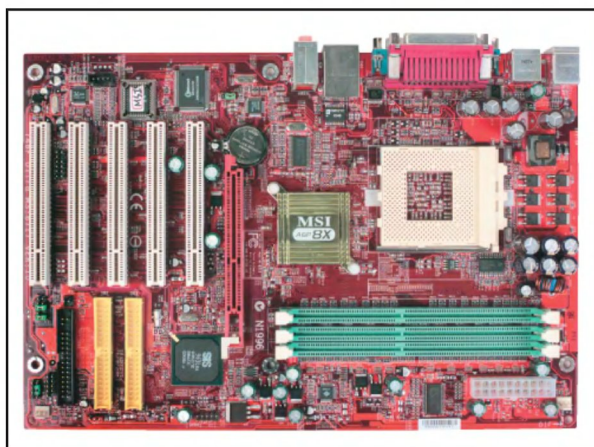
Rather than use the traditional Northbridge and Southbridge naming conventions, NVIDIA has new terminology. There are two options of Northbridge-style chips, the System Platform Processor (SPP) and the Integrated Graphics Processor (IGP). These are almost identical chips, differentiated only by the inclusion of Integrated GeForce4 MX graphics in the IGP. Rather than Southbridges, NVIDIA has the Media and Communications Processor (MCP), which for the nForce2 is named the MCP-T.

KT400

When it comes to Athlon chipsets, VIA is the name that first springs to mind. Over the lifespan of the Athlon brand of CPUs, VIA has continuously released newer and faster chipsets, with the most recent being called the KT400. This chipset was released late last year and added support for new technologies, such as AGP 8x, to VIA's arsenal.

The KT400 is slightly slower than the nForce2, but is still a serious contender for your dollars. It supports USB 2.0, AGP 8x, six-channel AC'97 audio and 10/100 Ethernet. For communication between the Northbridge and Southbridge, VIA has used its 8x V-Link technology, which provides 533MB/s of bandwidth.

KT400 is due to be replaced by KT400A over the next few months. This revision was first thought to be a dual-channel DDR chipset, like the nForce2 or Intel's e7205 chipset for the P4.



ABOVE: The MSI 746F Ultra, sporting the company's red PCB.

However it has been confirmed as a single-channel DDR chipset with support for DDR400. Undoubtedly we can also expect to see performance boosts to try and cut the lead of the nForce2.

SiS 746FX

The other new Athlon chipset comes from budget chipmakers SiS, in the form of the 746FX. While not a contender in the performance or features stakes (you will notice that none of the boards tested are based on this chipset), it is still a viable cheap alternative for the Athlon XP.

Feature-wise, the 746FX is a definite competitor. With DDR400 support, 8x AGP, USB 2.0, integrated 10/100 Ethernet and six-channel AC'97 audio it is similar to the KT400 in regards to support and features.

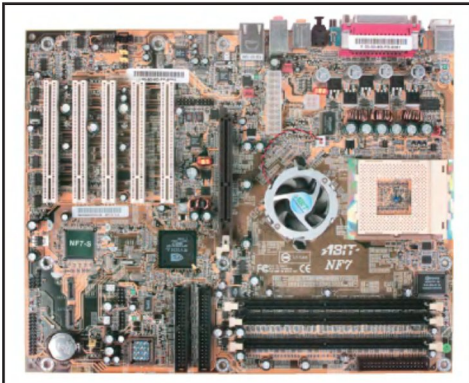
Communication between the Northbridge and Southbridge is handled via SiS' MuTIOL 1G technology, which is touted to deliver 1.2GB/s of bandwidth.

BIOs at dawn

With an Athlon XP 3000+ in hand, we issued another challenge to motherboard manufacturers: each should send us its most kick-arse Athlon mobo. With 10 of the best boards on the face of the planet in hand, we set out to determine which really stand out from the pack.

The boards were all tested with two 512MB sticks of Corsair XMS3200, running at DDR333 speeds, in parity with the 333MHz effective FSB of the Athlon XP 3000+ (for nForce2 motherboards, tests were all run with the RAM in dual-channel mode), and an Albatron GeForce4 Ti4800SE.

Testing was done using SYSmark2002, Unreal Tournament 2003 (using the CPU test settings from the HardOCP UT2003 benchmark utility) and the CPU tests in 3DMark03. This was using Windows XP Professional with Service Pack 1 and DirectX 9, with the latest reference drivers. For the sake of comparison, we have also included the scores from an MSI SiS746FX motherboard using the same components.



ABIT NF7-S

SPECIFICATIONS: One 10/100 Ethernet port; USB 2.0; IEEE 1394; AGP 8x; five PCI slots; six-channel audio; SATA RAID; ATX 12V power plug.

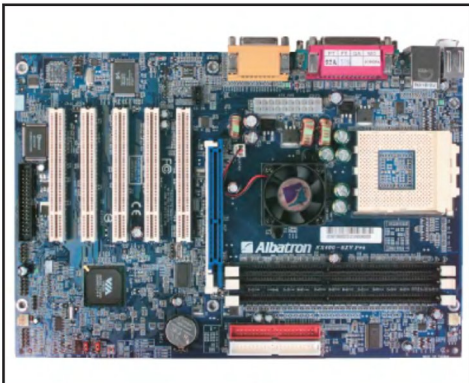
CHIPSET: nForce2 **NORTHBRIDGE:** SPP **SOUTHBRIDGE:** MCP-T

WEBSITE: ABIT www.abit.com.tw

DISTRIBUTOR: Bokerp www.bokerp.com.au **PHONE:** 1300 665 377

PRICE: \$270

ABIT's initial foray with the nForce chipset was a limited one, with a single micro-ATX model, something that it has since rectified by launching the NF7-S board, which will be followed by the NF7-M IGP variant. The board layout is very sparse, with easy access to the HSF mounting lugs on the socket. However installing a full-length AGP card could be tricky due to IDE and RAID placement.



Albatron KX400-8XV Pro

SPECIFICATIONS: One 10/100 Ethernet port; USB 2.0; AGP 8x; five PCI slots; six-channel audio.

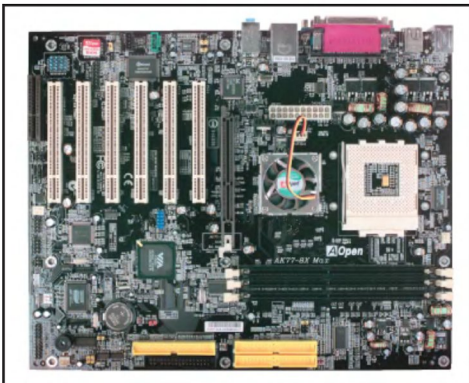
CHIPSET: KT400 **NORTHBRIDGE:** VT8377 **SOUTHBRIDGE:** VT8235

WEBSITE: Albatron www.albatron.com.tw

DISTRIBUTOR: AMI Computers www.ami-computers.com **PHONE:** (02) 9763 2122

PRICE: TBC

It has been a long while since we have seen a board this tiny in the labs. Albatron's KT400 offering is so narrow in fact, that a full length video card happily overhangs one edge of the board. Compared to some of the boards in the roundup, the KX400-8XV Pro is fairly feature-poor, but still a good solid board for. Our only real complaint is the dodgy capacitor placement.



AOpen AK77

SPECIFICATIONS: One 10/100 Ethernet port; USB 2.0; IEEE 1394; AGP 8x; six PCI slots; six-channel audio; SATA RAID with an extra ATA133 port.

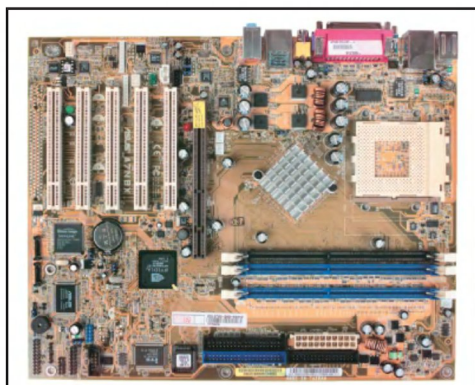
CHIPSET: KT400 **NORTHBRIDGE:** VT8377 **SOUTHBRIDGE:** VT8235

WEBSITE: AOpen www.aopen.com.tw

DISTRIBUTOR: Bluechip www.bluechipit.com.au **PHONE:** (02) 8745 8400

PRICE: TBC

With a very impressive featureset, AOpen's KT400 offering has something here for everyone. Besides the standard features, the board also sports AOpen's Die-Hard dual-BIOS technology and the cutely named Dr Voice audible POST diagnostics. Thanks to the use of a hybrid Marvel SATA/Promise ATA133 controller, the board supports a healthy number of drives.



ASUS A7N-8X Deluxe

SPECIFICATIONS: Two 10/100 Ethernet ports; USB 2.0; IEEE 1394; AGP 8x; five PCI slots; six-channel audio; SATA RAID.

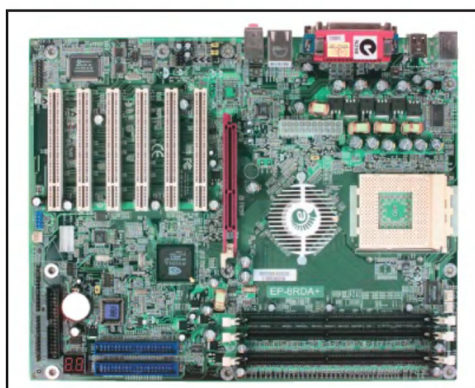
CHIPSET: nForce2 **NORTHBRIDGE:** SPP **SOUTHBRIDGE:** MCP-T

WEBSITE: ASUS www.asus.com

DISTRIBUTOR: CASSA www.cassa.com.au **PHONE:** (07) 3256 1999

PRICE: TBC

ASUS' A7N-8X motherboard is used by AMD in its review systems, thanks to the level of performance and stability delivered by the nForce2. This board shows what an SPP-based nForce2 board is capable of, being the only one in the roundup to make use of the dual-Ethernet technology built into the chipset. We had concerns with the how close the capacitors were to the HSF mounting lugs.



EPoX 8RDA+

SPECIFICATIONS: One 10/100 Ethernet port; USB 2.0; IEEE 1394; AGP 8x; five PCI slots; six-channel audio; LED POST readout.

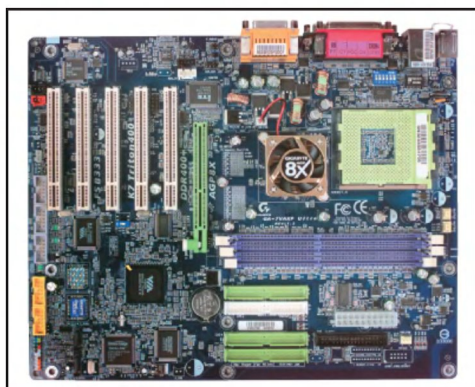
CHIPSET: nForce2 **NORTHBRIDGE:** SPP **SOUTHBRIDGE:** MCP-T

WEBSITE: EPoX www.epox.com.tw

DISTRIBUTOR: WESTAN www.westan.com.au **PHONE:** N/A

PRICE: TBC

While the original nForce chipset never really captured the enthusiast market, the eagerness with which respected overclocking-friendly companies like EPoX have jumped onto the nForce2 is refreshing. EPoX's nForce2 offering is a beautifully clean motherboard, with nothing obstructing the HSF mounting lugs. A full-length video card however almost touches the RAM slots.



Gigabyte GA-7VAXP Ultra

SPECIFICATIONS: One 10/100 Ethernet port; USB 2.0; IEEE 1394; AGP 8x; five PCI slots; six-channel audio; ATA133 RAID; SATA RAID; Dual-BIOS.

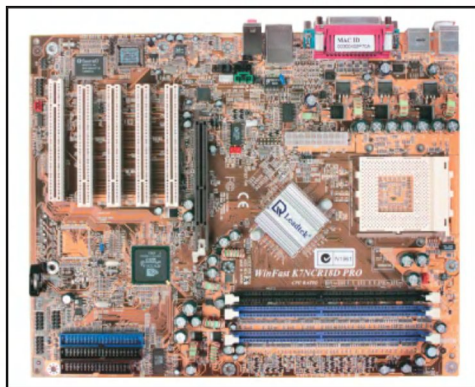
CHIPSET: KT400 **NORTHBRIDGE:** VT8377 **SOUTHBRIDGE:** VT8235

WEBSITE: Gigabyte www.gigabyte.com.tw

DISTRIBUTOR: SYNnex www.synnex.com.au **PHONE:** N/A

PRICE: TBC

If you are looking for a motherboard that is an absolute joy to work with, then the Gigabyte GA-7VAXP Ultra is your baby. Colour is used to denote what standards are supported by what slot, the corners are nicely rounded and both the AGP and the CPU socket are unobstructed and easy to access. This board is especially features packed, including RAID and SATA connectivity.



Leadtek K7NCR18D

SPECIFICATIONS: One 10/100 Ethernet port; USB 2.0; IEEE 1394; AGP 8x; five PCI slots; six-channel audio.

CHIPSET: nForce2 **NORTHBRIDGE:** SPP **SOUTHBRIDGE:** MCP-T

WEBSITE: Leadtek www.leadtek.com

DISTRIBUTOR: BCN n/a **PHONE:** N/A

PRICE: TBC

When the name Leadtek is mentioned, it's usually video cards not motherboards that spring to mind. But Leadtek has been in the motherboard game for a while now, and has leveraged it's position as one of NVIDIA's top tier partners to produce the nForce2-based mobo. A full-length video card comes nanometres from touching the capacitors near the edge of the motherboard though.

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"Hot Award"
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Albatron 845PEV P.	DDR439	FSB667
Asus P4PE	DDR421	FSB650
Gigabyte 8PE67 Ultra	DDR415	FSB653

In AnandTech's recent 845PE shootout, the Albatron PX845PEV Pro was the highest performing overclocker compared to ASUS and Gigabyte.

*Data provided by ANANDTECH



KX400+ Pro
"Highly Recommended"
Overclockers.com
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PX845PEV Pro
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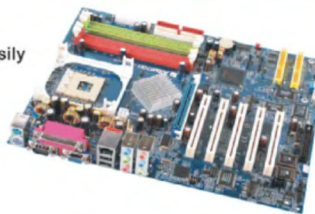
Ti4680P Turbo GeForce4 Ti4200-8X GPU



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- 128MB 550MHz (128bit) 3.3ns DDR memory
- Use 8-Layer PCB made overclocking more easily
- AGP 8X provides 2.1GB/s transfer rates
- Supports TV-Out, DVI, nView for multi-display options
- Bundled DVD player software and two retail version games



PX865PE ProII



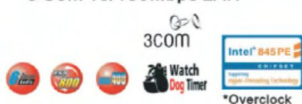
- Supports Intel®Pentium®4 Processor
- Socket 478 with FSB 800MHz (overclock to 1GHz)
- Dual Channel DDR400 memory (up to 4GB)
- Supports AGP8X Graphic Accelerator
- Built-in Gbits (10/100/1000Mbps) LAN
- Supports ATA133/RAID ATA 133/SATA/RAID Serial ATA (RAID 0)
- 8ch Audio (Hardware)/8 USB2.0/2 IEEE 1394/SPDIF In-Out
- BIOS Mirror (BIOS update)/Voice Genies (Audio Diagnostics)



PX845PEV-800 Intel® 845PE/ICH4 chipset



- Supports Intel®Pentium®4 Processor
- Socket 478 with FSB 400/533MHz
- 3 DDR 266/333/400* memory Sockets
- 6 USB2.0/1.1 ports (4 by cable)
- 3 Com 10/100Mbps LAN



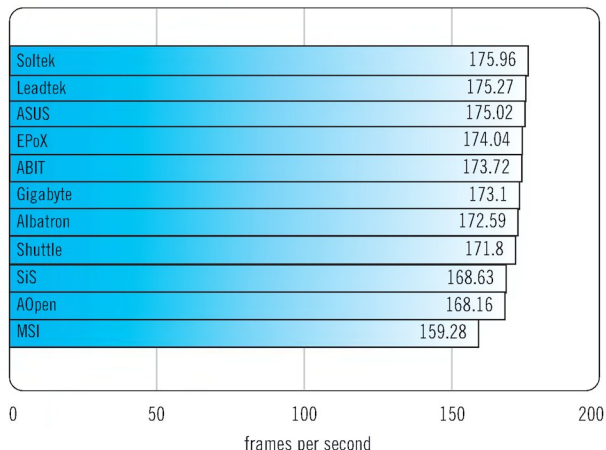
KX400-8XV Pro VIA KT400/8235 chipset



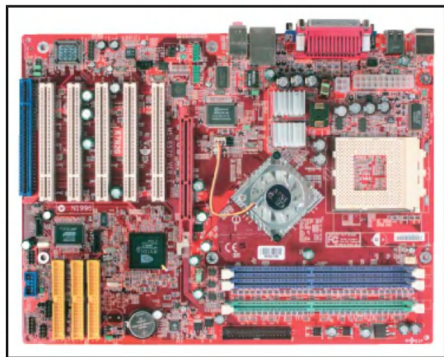
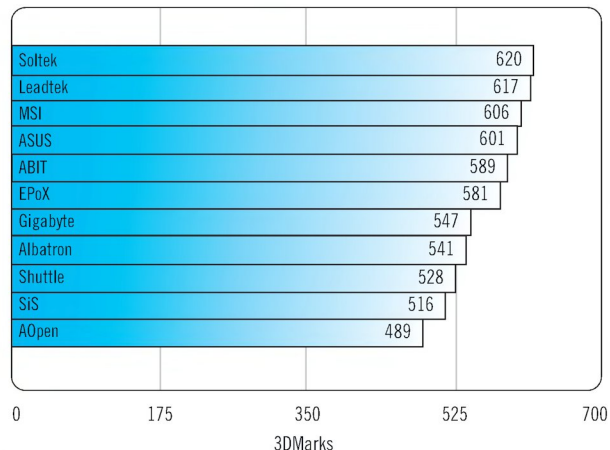
- Support AMD Athlon™/Athlon™XP/Duron™ Processor
- Socket A with FSB 266/333MHz
- Supports DDR266/ 333/ 400* (Overclock)
- Supports AGP8X Graphic Accelerator
- Build-in 3COM 10/100Mbps LAN
- AC'97 6ch Audio/ 5PCI/ ATA133/ 6*USB/ SPDIF In-Out



UT2003 – CPU test



3DMark03 – CPU test



MSI K7N2G-ILSR

SPECIFICATIONS: One 10/100 Ethernet port; USB 2.0; IEEE 1394; AGP 8x; five PCI slots; six-channel audio; SATA RAID with an extra ATA133 port.

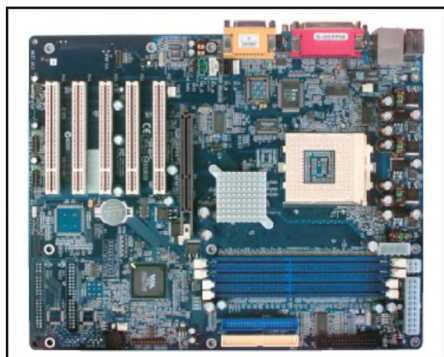
CHIPSET: nForce2 **NORTHBRIDGE:** IGP **SOUTHBRIDGE:** MCP-T

WEBSITE: MSI www.msicomputer.com.au

DISTRIBUTOR: N/A **n/a** **PHONE:** N/A

PRICE: TBC

MSI was one of the first to adopt the nForce, and for the nForce2 it has gone all out with its IGP version. Feature-rich, this is a great board for those not obsessed with 3D graphics performance. There's nothing to stop you mounting a full-length graphics card if you feel the Integrated GeForce4 MX no longer cuts the mustard.



Shuttle AK37

SPECIFICATIONS: One 10/100 ethernet port; USB 2.0; AGP 8x; five PCI slots; six-channel audio; ATX 12V or Molex power plug.

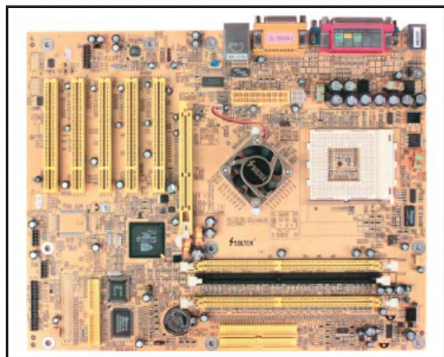
CHIPSET: KT400 **NORTHBRIDGE:** VT8377 **SOUTHBRIDGE:** VT8235

WEBSITE: Shuttle www.shuttle.com

DISTRIBUTOR: SATO **n/a** **PHONE:** N/A

PRICE: TBC

Whereas most of the boards in the roundup are laden to the gills with features, the Shuttle AK37 is a no-nonsense kinda mobo, lacking the RAID features of higher-end models. While it has ample clearance for full-length video cards, a bunch of capacitors will make mounting the HSF a niggly affair.



Soltek SL-75FRN-L

SPECIFICATIONS: One 10/100 Ethernet port; USB 2.0; AGP 8x; five PCI slots; six-channel audio; ATX 12V power plug.

CHIPSET: nForce2 **NORTHBRIDGE:** SPP **SOUTHBRIDGE:** MCP-T

WEBSITE: Soltek www.soltek.com

DISTRIBUTOR: AKA TECH **n/a** **PHONE:** N/A

PRICE: TBC

Perhaps the most instantly recognisable mobo in the roundup, Soltek's SL-75FRN-L is very yellow, with a gold-metallic finish for the PCB and bright yellow for nearly everything else. Love the look or not, this board's *got* performance. It's only fault is the position of the RAM slots in relation to the AGP slot.



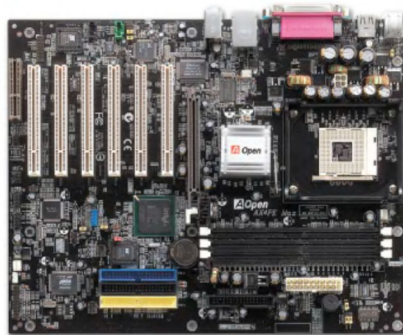
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MX46-533V



AK77-8X



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Peer-to-Peer	No	Yes



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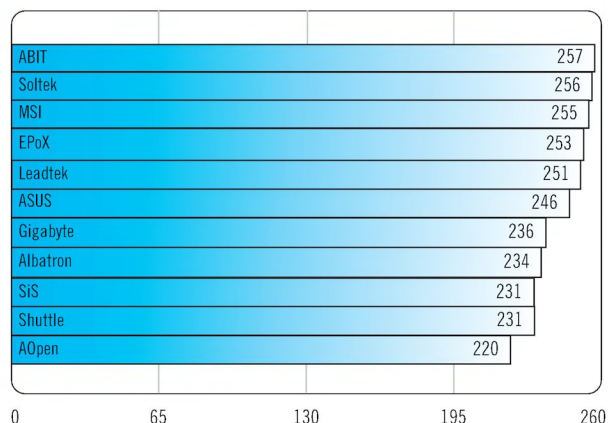
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bluechip
infotech

SYSmark2002 – rating



RESULTS

During the testing process, some very interesting patterns emerged. All the nForce2 boards tested worked beautifully with the Athlon XP 3000+ right out of the box; however most of the KT400 boards required a BIOS flash in order to enable support. Some of these problems appear to stem from a slight rejigging of the PR formula originally used for the Barton core. Originally the Athlon XP 3000+ was slated to run at 2.24GHz, using the 166MHz double-pumped bus and a 13.5x multiplier. This was then changed to a 13x multiplier in the final launch version of the CPU, which runs at 2.16GHz. Because of this some of the pre-existing BIOSes that were touted to support the 3000+ had issues recognising the CPU. This was fixed with a BIOS flash, however, the AOpen board we tested had a beta BIOS, and not everything was running at full speed. This led to somewhat disappointing benchmark results that should improve with new BIOS revisions.

The other interesting fact came via 3DMark03's CPU frequency readings. Thanks to various minor overclocking tricks featured as BIOS options these days, the recorded CPU speeds varied between motherboards, ranging from 2.13GHz to 2.21GHz. This is a fairly minor fluctuation and would have minium bearing on benchmark results, but it is interesting to note that there is nothing cut and dried about the speed at which an Athlon actually runs, despite what the BIOS says about the PR rating.

The other trend is best seen in the SYSmark2002 rating results, and shows why nForce2 has become the premium chipset for Athlon users. The nForce2 boards were consistently faster than the KT400 ones (and the SiS 746FX board was slower still). A big part of this are the IDE drivers packaged in the nForce2 drivers. Much like the Intel Application Accelerator for the Pentium 4, these IDE drivers gave a boost in the order of 10 points on the SYSmark2002 rating when compared to older driver versions.

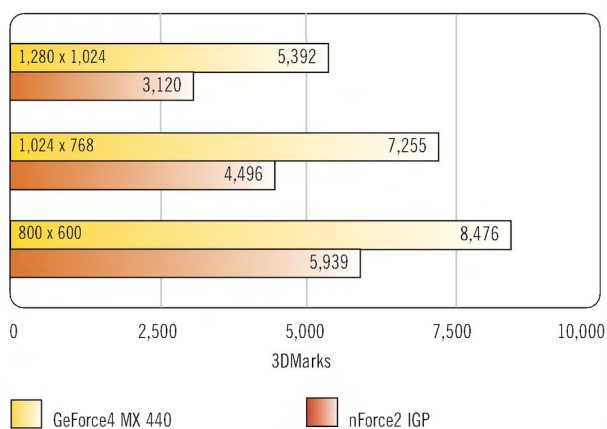
While all the nForce2 boards performed within a whisker of each other, the Soltek SL-75FRN-L was the consistent standout performer, sneaking it in by the skin of its teeth. As a general rule, the nForce2 boards were an absolute dream to use, and any of them would make a great platform for the Athlon XP, but there has to be a performance winner, and the Soltek takes the honours proudly.

In terms of features, while nothing here approaches the

NFORCE2 IGP

The nForce2 IGP is based around the GeForce4 MX GPU, but runs at a lower speed because of the intricacies of integrating the GPU into the chipset. That said, the performance of the Integrated GeForce4 MX GPU is still widely acknowledged as being light years ahead of any other integrated graphics core currently available. To demonstrate the relative graphics performance between the nForce2 IGP and the GeForce4 MX 440, we ran some 3DMark2001SE benchmarks, which verify our assumptions. While the Integrated GeForce4 MX GPU is significantly slower than the GeForce4 MX 440, it still delivers a level of performance fine for casual gaming or low-resolution TV gaming.

3DMark2001SE Pro



comprehensive feature set seen on ABIT's Max series of motherboards, some of the nForce2 ones come close. Serial ATA support is featured on many of the boards, and it now looks like sanity is returning in the placement of SATA ports on the motherboard.

All the SATA controllers seen in the roundup support two ports, however the MSI K7N2G-ILSR uses a hybrid Promise/Marvel controller that support the two SATA ports but only one parallel ATA port. This relegates those who wish to use Parallel ATA RAID to a trip to a retailer to buy a grossly overpriced Serial-to-Parallel adaptor.

In terms of features, the MSI K7N2G-ILSR and ASUS A7N8X-Deluxe both stand out from the pack. It's hard to split these two, because they both have a slightly different focus. ASUS was the only company in the roundup to make use of the very handy dual-LAN feature of the nForce2, and it also had the most feature-rich SPP-based nForce2 board. MSI on the other hand have provided an IGP variant that packs nearly everything you will need onboard, making it fantastic for those who, gasp, are happy with the respectable integrated graphics performance. MSI's board would make a great basis for a home theatre PC.

Overall the standard of motherboards for the Athlon at the moment is incredibly high; we would even go so far as saying that this was the most trouble-free motherboard roundup *Atomic* has run, with none of the often confusing and chaotic hardware glitches that are usually experienced when testing such a range of motherboards. Athlon 64 may have been delayed, but with motherboards like these, the Athlon XP can still cut it in the performance and feature game.

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- Supports Hyper-Threading Technology processor up to 3.06GHz or above
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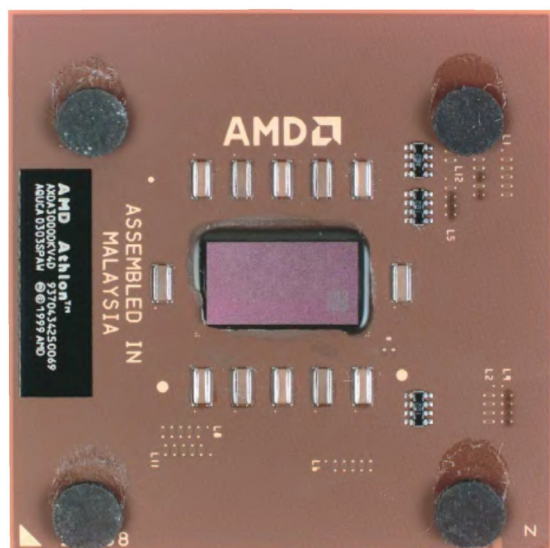
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BARTON BOOST



The battle between the Athlon and the Pentium 4 is one of the great of our time. Thanks to the Athlon, the Pentium 4 was not even considered a viable option by enthusiasts for a some time. But the pendulum swung back to Intel when it shrank the P4's die to 0.13-micron and doubled the L2 cache to 512KB in the form of the Northwood core, which was enough to make the P4's cache-hungry architecture grow into the beast it is now.

While AMD's Palomino and Thoroughbred cores were still respectable performers, the Pentium 4 pulled ahead in the performance stakes. Now AMD has finally launched the Barton core for the Athlon, taking the 0.13-micron Thoroughbred core and doubling the L2 cache to 512KB.

We have been anticipating Barton for a while now, largely through curiosity about whether or not the increased cache will provide a big performance boost to the Athlon architecture.

It arrived in the form of the Athlon 3000+, AMD's new flagship CPU. Running with a multiplier of 13 on a 166MHz/333MHz effective FSB, the new core runs at 2.158GHz, which is actually slower than the Thoroughbred-cored Athlon XP 2800+ thanks to the way AMD works out its PR ratings for CPUs.

Barton is very widely supported across nForce2, KT400-, SiS 756FX- and KT333-based motherboards (as long as you are using the latest BIOS). In fact, the only problems we encountered were with slightly older BIOSes that were designed for an earlier revision of the 3000+ specification that called for a 13.5 multiplier.

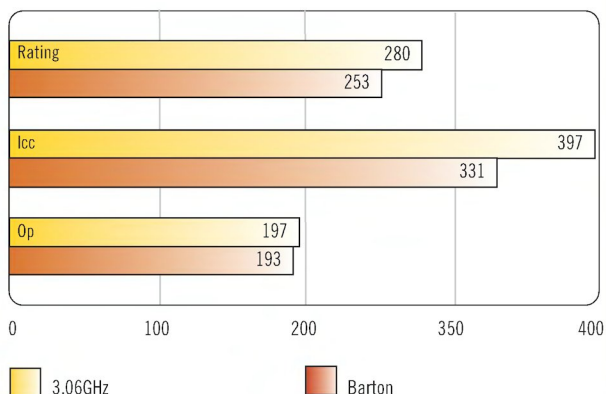
Apart from that, this has been the most hassle-free Athlon core we have encountered.

We tested the CPU against Intel's flagship 3.06GHz Pentium 4, using an expanded suite of the tests used for the roundup. Every other test indicates that there is no difference between the two CPUs.

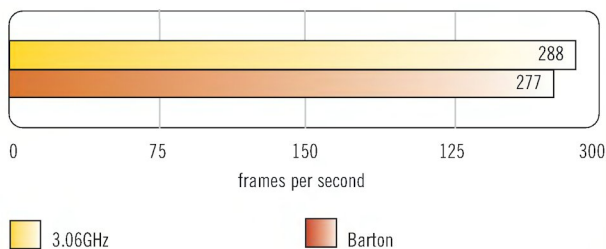
In Unreal Tournament 2003 and the second 3DMark03 CPU test there is nothing between the two chips, and the victories by the P4 in Quake 3 and the Athlon in the first 3DMark03 test are by the narrowest of margins.

AMD has well and truly struck back with the Barton core, again showing why pure megahertz ratings mean very little, and when paired with a chipset like the nForce2, it's one of the meanest PCs out there.

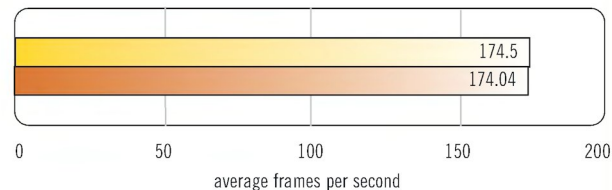
SYSmark2002



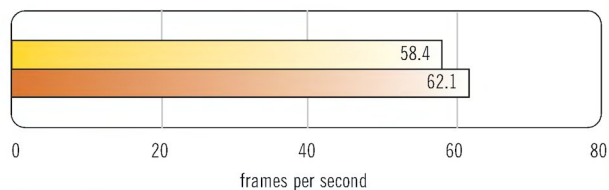
Quake 3: Arena – CPU



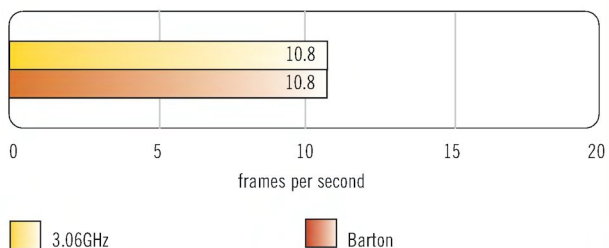
UT2003 – CPU test



UT2003 – CPU test 1



UT2003 – CPU test 2



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Mainboard

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The P4PB Ultra mainboard exudes Xtreme from the moment you set eyes on the screaming-head box packaging design. Open the box and you start to grasp the true extent of the extremities. The P4PB Ultra's performance and connectivity features are nothing short of breath taking. Throw in the ultra cool Modding Cables, Smart Media Panel and a host of other extras you are really talking about an Xtreme Mainboard for Xtreme Users.

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- VIA P4X400 Chipset
- **DDR333** SDRAM Support up to 3GB
- **AGP 8X/4X**
- 5 PCI, 1 CNR
- **ATA/133/100**
- VIA **6 Channel Audio**
- VIA **IEEE 1394** (Optional)
- 6 **USB 2.0/1.1**
- VIA 10/100 **LAN**
- **Smart Card Reader** Support

P4PB 266E



- Intel® Pentium® 4 Processor Support @ **533/400MHz FSB**
- VIA P4X266E Chipset
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Cyber Flame by Yosogoth: This render started life as a Poser model I exported to 3ds format. The entire render was done in 3DS Max using a very simple raytraced material with reflection enabled. I used three omni lights, moving them until I was happy with the way the light fell on to the model. I created a fire effect (out of view). That reflects off the model creating the effect I wanted. For the final render I used Mesh Smoothing by Subdivision, totaling in 683,520 faces. Resolution 4399 pixels by 3300 pixels, using the Catmull-Rom Anti-Aliasing filter.

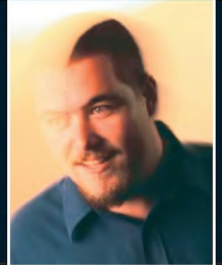
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I REVIEWS I

Suck my yardstick

JOHN GILLOOLY EXPLAINS WHY 3DMARK03 HAS CAUSED SUCH A SCANDAL, AND WHAT *ATOMIC* IS DOING ABOUT IT.



Early on in life, as one undergoes that wild rollercoaster ride of school, and perhaps further education, you realise that it's rare your total assessment will ride on a single test. In fact, if that was the case, we'd be looking at a school system that still rewarded the absolute cream of the academic crop, while relegating everyone else's valuable assessment to a meaningless dose of randomness.

What if the exam targets a single area that you haven't studied much, or the only subject in the course you're good at? The results would end up not just irrelevant, but also dangerously inaccurate and unusable for the purpose they were intended.

Benchmarking is exactly the same. Before debating the pros and cons of any specific benchmark, or type of benchmark, there is a need to first look at what you're trying to achieve, and whether the methods you're using contribute to getting a reliable answer. The fundamental rule here is that conclusions should never be drawn from a single benchmark result, and that all testing should involve a *suite* of benchmarks.

The recent release of 3DMark03 has caused a major storm among various parties and reignited a long running debate about synthetic vs. real world benchmarks. It has also highlighted an important fact about targeting tests and desired results.

3DMark03 is a synthetic benchmark. This means it's not based on a real world application; rather it has been designed to evaluate performance, much like SiSoft Sandra or PCMark. At the other end of the spectrum are application-based benchmarks like Quake 3, SYSmark or Unreal Tournament 2003. While it's these benchmarks that will give us numbers directly applicable to how that product will perform in a certain program (or suite of programs), synthetic benchmarks are still incredibly useful.

Forget completely weird aberrations like the intense competition to take out the

highest 3DMark score in the world, and focus on what 3DMark gives us. It provides a standard performance metric for comparative testing. The benchmarks, by their very nature, are forward-looking; and in the case of 3DMark03, its target is DirectX 9, an API that has at least two years of longevity.

However, NVIDIA is arguing that Futuremark's way of implementing DirectX 9 differs from how game developers like id software will be using the API.

We saw similar worries emerge when 3DMark2001 was first released, although these cries came mainly from reviewers and other professional benchmarkers. 3DMark2001 at the time was seen to favour NVIDIA's GeForce3 because of penalties given to non-DirectX 8-compliant hardware. Then within a year, such hardware, and the benchmark, were well on their way to becoming commonplace.

When reviewing these cards, if we had tested our first RADEON 8500 purely with the DirectX 7-level 3DMark2000 then the results would have shown a performance difference, but been largely meaningless as a yardstick for the card's competence in modern or future games. It would have also neglected a huge chunk of the functionality and hence the cost of the card.

3DMark03 is designed to be used as a complement to 3DMark2001SE for the present time. A great example of this is the fact that 3DMark03 contains a test designed for DirectX 7 called Wings of Fury, but this does not use the same methods as the DirectX 7 tests in 3DMark2001SE. Instead the Wings Of Fury test uses vertex shaders to replicate DX 7 functionality, which initially seems odd. However, 3DMark03 is trying to replicate how Futuremark and its beta partners see game developers coding for multiple generations of hardware; aiming at DirectX 8 for best performance, but cascading down to fixed hardware transform and

lighting functions for cards lacking DX 8 or above vertex shaders.

3DMark03 and 3DMark2001SE are generations apart, and there is a danger that people will see the benchmarks as a timeless measure of performance under a specific API, when they're actually designed to target hardware performance at certain points in time, penalising those cards that lack the basic functionality gamers seek.

When run in combination with actual games, these tests give a meaningful picture of performance. For now, however, the most up-to-date game benchmark is Unreal Tournament 2003, and despite the fact that NVIDIA talks extensively about the relevance of Doom 3 as a benchmark, it is still but a twinkle in John Carmack's milkman's eye, with a Xmas release most likely. Serious Sam is a very capable benchmark, but it uses tweaked configurations for different cards, and it often has weird quirks with new hardware.

The validity of 3DMark03 as a representation of the current generation of video cards won't be clear for some months yet. Until then, expect to see 3DMark03 results in *Atomic* used as part of benchmarking *suites*, with commentary on what the benchmark shows, as well as how 3DMark03 is performing relative to the rest of our benchmarks.

In the end, this whole issue comes back to the dearth of decent gaming benchmarks. When benchmarking functionality is actually built into a game it more often than not ends up being hurried and partially implemented, usually thanks to the publisher. What they need to realise is that rock-solid benchmarking functionality can really help drive the long term sales of a game.

The key is to read smart when looking at results, look and see what is being tested and how patterns of results vary between tests. Keep that in mind and every benchmark result will be your friend.

ATOMIC BENCHMARKS

At *Atomic*, it is our primary intention to give you the final word on the latest in hardware and PC technology. An integral part of determining the performance of a particular piece of hardware is benchmarking, and this is something that we take very seriously in the *Atomic* Labs.

SYSmark2002

SYSmark2002 is a product of the collaboration between industry group BAPCo (www.bapco.com) and MadOnion.com (www.madonion.com). It is one of the next-generation application benchmarks and is designed to more accurately replicate the day-to-day workload that a system is subjected to. The focus of the benchmark is on Internet Content Creation and Office Productivity tasks, which combine to produce a final performance rating.

Unreal Tournament 2003

UT2K3 is the latest and greatest first person shooter from Epic. The game makes use of the new Unreal Warfare engine, and as such is a perfect benchmark for system performance. We use HardOCP's (www.hardocp.com) benchmarking utility to run a series of flyby benchmarks at varying resolutions to test performance. The utility also features support for a low resolution/high geometry CPU test. Results are in average frames per second.

3DMark2001SE Pro

3DMark2001SE Pro from MadOnion.com is the next progression of the popular benchmark utility. It also uses the MAX-FX engine and heavily emphasises DirectX 8.1 functions, including programmable shaders. The results are not comparable with results from 3DMark2000 Pro.

Serious Sam: SE

Serious Sam: The Second Encounter is used for testing OpenGL performance. For game tests we use the Cooperative demo, which outputs an average framerate trimmed of excessive peaks.

It also contains a fillrate test, which outputs fillrates for various texturing methods and is useful for making comparisons between video chipsets.

HSF testing – Chernobyl

To test heatsink fans we use our custom engineered CPU replicator, known as Chernobyl. This beastie pumps a variable wattage through a solid copper CPU die replica, with a temperature probe mounted exactly in the centre of the die replica. Chernobyl results are not directly comparable with real world temperatures, but do provide a very accurate benchmark.

Quake 3: Arena *AtomicMPC* demo

Quake 3: Arena (Q3A), from id Software, is a very popular first person shooter, and represents widely used OpenGL gaming technology. Q3A has a built-in benchmarking utility and built-in demos that can test graphics card performance. These demos are fairly simplistic, so we developed our own *AtomicMPC* demo that pushes the hardware as far as possible.

Other benchmarks

Sometimes we need to break down the tests into more specific areas, such as hard disk performance, memory performance, or a particular facet of 3D, such as T&L. We can draw on a vast number of applications, games and dedicated benchmarks such as CD Speed 99, DisplayMate, Dronez, MDK2, or Adaptec ThreadMark to perform these tests. We also use a Lian Li temperature probe from Anyware (www.anyware.com.au) for tests that involve the measurement of temperatures, such as HDD heatsinks.

Atomic Hot Award

The *Atomic* HOT award is given only to the most kickarse products to hit the labs, ones that score 9 or greater. They're the ones we'd want, or simply the ones we want to make love to.



Atomic testbench specs

Both test systems use Windows XP Professional with Service Pack 1, DirectX 8.1 and the latest chipset and video drivers.

- AMD Athlon XP 1800+ system – ASUS A7V266-E motherboard (supplied by CASSA: www.cassa.com.au)
- Intel Pentium 4 2GHz – ABIT BD7II-RAID motherboard (supplied by ABIT: www.abit.com.tw)

Common components

- Samsung 256MB PC2700 DDR-RAM (supplied by CASSA)
- Samsung 256MB PC800 RDRAM (supplied by CASSA)
- Hercules Prophet II GTS 32MB (supplied by Guillemot: <http://au.hercules.com>)
- 64MB Apacer memory keys (supplied by Anyware: www.anyware.com.au)
- Hercules Prophet II GTS 32MB (Supplied by Guillemot: www.hercules.com)
- Sound Blaster Live! Player (Supplied by Creative Labs Australia: www.creaf.com)
- ASUS 52X CD-ROM (supplied by CASSA)
- Belkin PCI FireWire card (supplied by Belkin: www.belkin.com.au)
- Belkin PCI USB 2.0 card (supplied by Belkin)

Benchmark settings

3DMark2001SE Pro

- 1,024x768; 16-bit colour; 16-bit textures; 16-bit Z-buffer; triple frame buffer.
- 1,024x768; 32-bit colour; 32-bit textures; 24-bit Z-buffer; triple frame buffer.
- 1,600x1,200; 16-bit colour; 16-bit textures; 16-bit Z-buffer; triple frame buffer.
- 1,600x1,200; 32-bit colour; 32-bit textures; 24-bit Z-buffer; triple frame buffer.

Quake 3: Arena *AtomicMPC* Demo

All tests use Quake 3: Arena 1.27g and our custom Q3A demo recorded by the *Atomic* staff.

- CPU testing: 320x240; maximum geometry detail; minimum graphics settings; high sound quality.
- Graphics cards: Low quality – 1,024x768; normal quality graphics settings; sound disabled.
- Medium – 1,280x1,024; maximum graphics settings; with all game sound disabled.
- High – 1,600x1,200; maximum graphics settings; with all game sound disabled.



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- 64MB DDR memory
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- Support Video In, Video Out
- 3D Game (Full Version)



Excilibur Radeon™ 9000

- 64MB DDR memory
- AGP 4x/2x
- TV-out



Excilibur Radeon™ 7500

- 64MB/128MB DDR memory
- AGP 4x/2x
- TV-out, DVI, Secondary VGA (optional)



Excilibur Radeon™ 7000

- 32MB/64MB SDR/DDR memory
- AGP 4x/2x bus / PCI bus



Excilibur Rage™ 128 PRO

- 32MB SDR memory
- AGP 4x/2x
- TV-out



HIS Radeon™ 8500
Editor's Choice
HardTECS4U.com
Germany
April, 2002



HIS Radeon™ 8500
Hardware Recommendation
PC-Shopping.de
Germany
April, 2002



HIS Radeon™ 9000 PRO
"Gold" Award
PC Format
UK
August, 2002



HIS Radeon™ 9000 PRO VIVO
"Editor's Choice"
CD Action
Poland
October 2002



HIS Radeon™ 9000 PRO VIVO
"Best Buy/Good Price"
PC Format
Poland
October 2002



HIS Radeon™ 9000 PRO VIVO
Highly Recommended
Tom's Hardware Guide
Turkey
October 2002



HIS Radeon™ 9700 PRO
"Good Price & Performance"
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HIS Radeon™ 9000 PRO VIVO
Editor's Recommendation
PC Professional
Germany
November, 2002



HIS Radeon™ 9700 PRO
"Best Buy" Award
Chip
Germany
November 2002



HIS Radeon™ 9700 PRO
"MAX POWER"
PC Format
Poland
November 2002



HIS Radeon™ 9700 PRO
"Very Good" Award
PC Dinsk
Germany
December 2002



HIS Radeon™ 9700
"Silver Award" Hardware Info
Netherlands
December 2002



HIS Radeon™ 9700
Highly Recommended
Tom's Hardware Guide
Turkey
December 2002



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Highly Recommended by
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Newstead, QLD 4006
Ph: 61 7 3852 1899 Fax: 61 7 3852 1755

SA

Unit 4, 2-4 Marker Ave.,
Marleston, SA 5033
Ph: 61 8 8371 3388 Fax: 61 8 8371 3833

WA

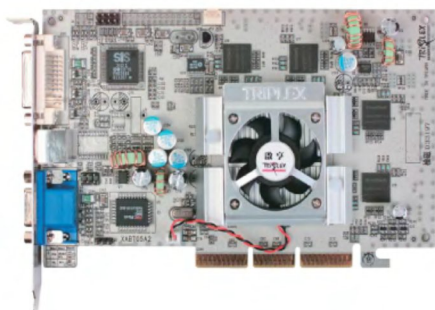
Unit 2, 126 Hector St West,
Osborne Park, WA 6017
Ph: 61 8 9443 3388 Fax: 61 8 9443 4420

NZ

Unit B, 515A Mt Wellington Hwy.,
Mt Wellington, Auckland, NZ
Tel: +64-9-573 2277 Fax: +64-9-573 0148

Framerate

Things are always comparable – that's the beauty of metaphors. Well, this month was like waiting for our copy of the *Deluxe Extended Edition* of *Lord of the Rings*, and the postman turning up with *Titanic – The Super Soppo Selection*. If you hadn't guessed, we're referring to the GeForce FX. If we had expectations, they're lying wilted on the Labs' floor now.



Triplex Xabre Ultra 600

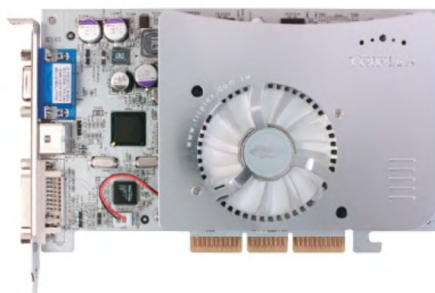
SPECIFICATIONS: SiS Xabre600; AGP 8x; TV-out; 64MB DDR-RAM.

CORE SPEED: 300MHz **MEMORY SPEED:** 600MHz **PRICE:** \$TBA

WEBSITE: Triplex www.triplex.com.tw

SUPPLIER: Oxygen www.oxygen.net.au

After almost a year of waiting, we finally get a chance to see SiS' high-end Xabre600 GPU, sitting proudly on one of Triplex's silver PCBs. While the Xabre600 looks like a great performer on paper, tests show that it falls behind cards with slower speeds but much clever architecture. One worrying thing that we found with this card was that there was no thermal interface material of any kind between the core and the heatsink.



Triplex GeForce4 Ti4200-8x

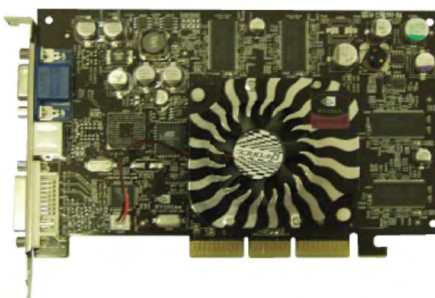
SPECIFICATIONS: NVIDIA GeForce4 Ti4200 with AGP 8x GPU; TV-out; 128MB DDR-RAM.

CORE SPEED: 250MHz **MEMORY SPEED:** 500MHz **PRICE:** \$TBA

WEBSITE: Triplex www.triplex.com.tw

SUPPLIER: Oxygen www.oxygen.net.au

Triplex's entry into the incredibly overcrowded Ti4200 with AGP 8x market is certainly one of the most striking cards. On top of the silver PCB sits an exquisite silver heatsink that covers almost the entire card. In addition, the Triplex targets the card at the overclocking crowd through the use of 3.3ns DDR-RAM, which allows memory frequency to be pushed high in the pursuit of fast gaming.



Palit Daytona GeForce4 Ti4200 with AGP 8x

SPECIFICATIONS: NVIDIA GeForce4 Ti4200 with AGP 8x GPU; TV-out; 128MB DDR-RAM

CORE SPEED: 250MHz **MEMORY SPEED:** 500MHz **PRICE:** \$TBA

WEBSITE: Palit www.palit.com.tw

SUPPLIER: Sato Technology www.satotech.com.au

Palit is one of the longest standing of the budget video card brands, and its recently released Ti4200 with AGP 8x brings more than capable 3D performance to the cut-price table. The standout aspect of this card is the heatsink, which takes the now overtly familiar GeForce4 reference design and adds a natty little zebra stripe pattern to it. We wonder how much this design impacts airflow, but performance was not a problem.



MSI GeForce FX 5800 engineering sample

SPECIFICATIONS: NVIDIA GeForce FX 5800; FX-Flow cooler; 128MB DDR-II RAM

CORE SPEED: 400MHz **MEMORY SPEED:** 800MHz **PRICE:** \$TBA

WEBSITE: MSI www.msicomputer.com.au

SUPPLIER: MSI www.msicomputer.com.au

While Framerate is usually the domain of production cards, this next month we have included MSI's GeForce FX engineering sample. Once production of the GeForce FX ramps up we can expect cards on the market pretty quickly, so you can see how the card performs against other types. Just remember that this is an engineering sample, and the performance of production cards will only get quicker.

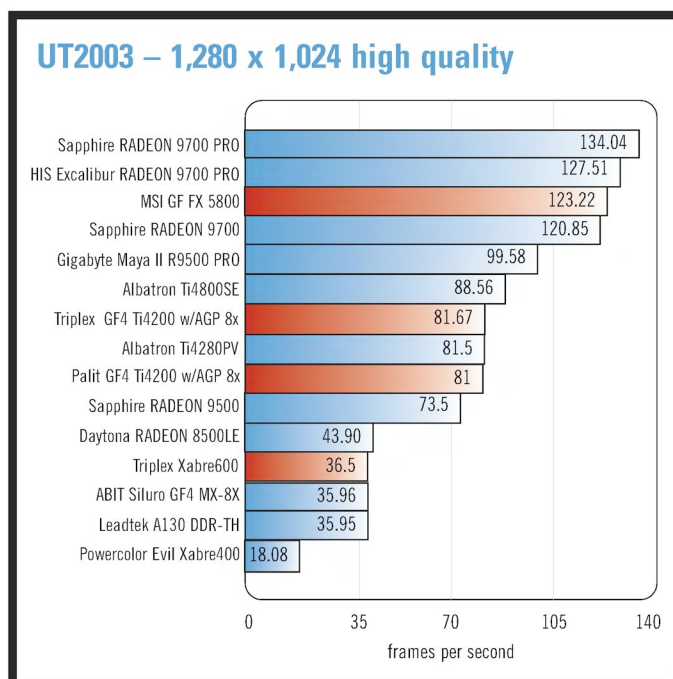
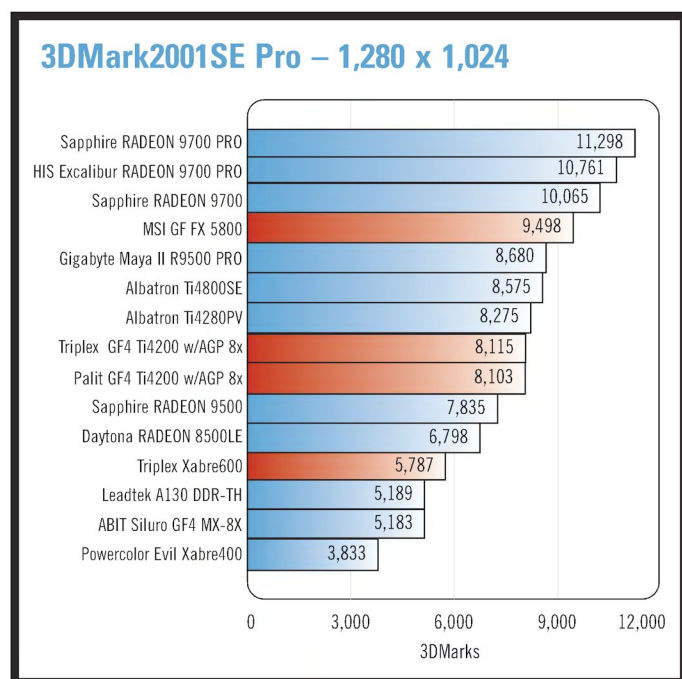
Video cards

Last month we said that the GeForce FX was about to emerge, and it has. Kinda. A month later and there are still no retail products available on the market.

Expect to start seeing products in incredibly small volumes soon, especially with the GeForce FX 5800 Ultra models. Production will begin to ramp up as manufacturers put the finishing touches on their GeForce FX 5800 designs, which will not be affected by NVIDIA controlling card manufacturing or limiting production runs. With Cebit happening this month in Germany, we can expect to see

some big announcements about new product lines from both NVIDIA and ATI. Hotly anticipated will be ATI's RV350 cards and NVIDIA's NV31 and NV34.

Once these products are announced and production begins the market will start moving towards top-to-bottom DirectX 9 compliance, so we can all play Doom 3, when it's finally released. It is definitely the calm before the storm at the moment. The last round of the video card wars has been won by ATI, now we will see NVIDIA striking back in the only way they know how.



■ New video cards this month ■ Old video cards

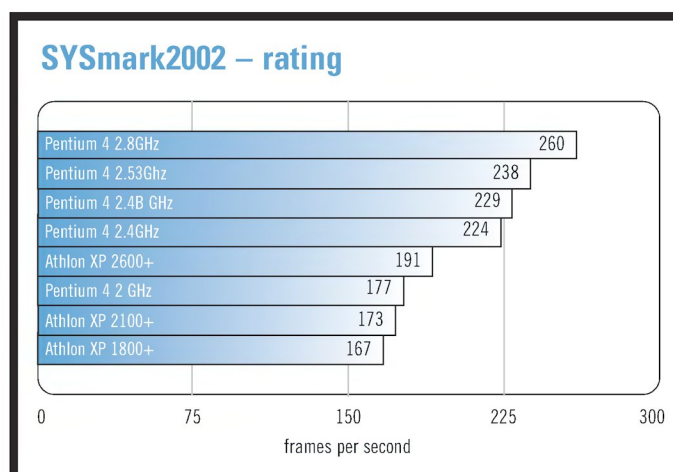
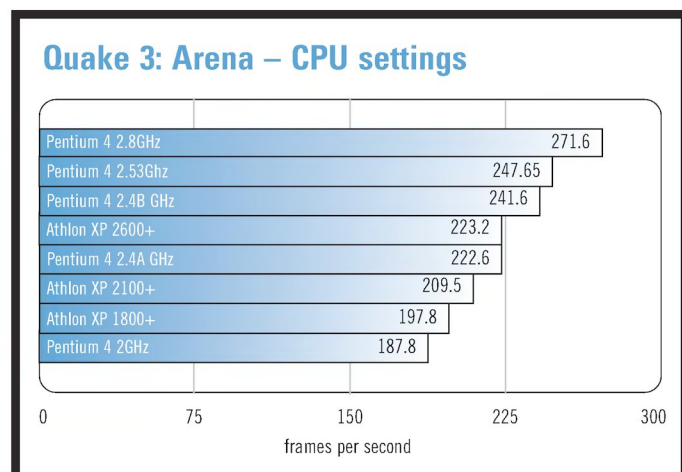
CPUs

AMD's new Athlon XP range was recently launched, using the core codenamed Barton. The main feature being the increase of the L2 cache to 512KB from the existing 256KB, taking the total onboard cache of the Athlon XP to 640KB.

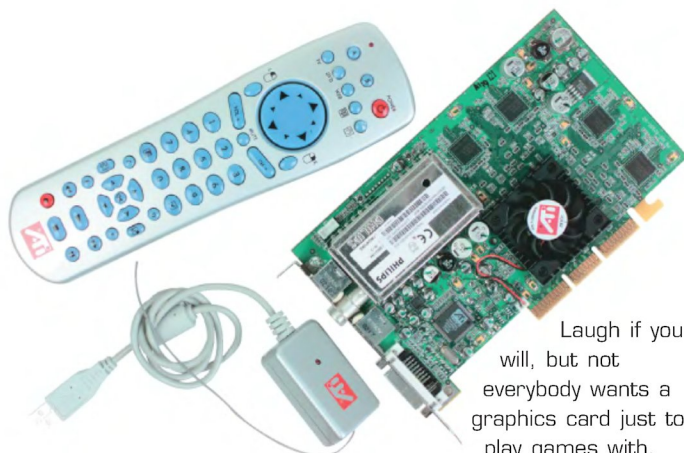
We have also been hearing strong rumours that Barton will move to a 200MHz/400MHz effective FSB in the next few months, further prolonging the life of this now-ancient CPU design and allowing for further longevity in the wait for the release of the Athlon 64 in September. Well, hopefully in September.

Intel on the other has huge plans ahead, especially for us enthusiasts. Sometime this year we will see the Pentium 4 jump to an 800MHz frontside bus, which will tide us over until the next generation 90-nanometre Prescott core.

It has also finally announced the mobile core codenamed Banias, which is now known as the Pentium M, and forms the centrepiece to Intel's new thin and light wireless notebook technology called Centrino. While the Pentium 4-M will still be the choice for us gamers, the Pentium M is a radical new philosophy for Intel.



Hercules 3D Prophet ALL-IN-WONDER 9000 PRO



Laugh if you will, but not everybody wants a graphics card just to play games with.

Yes, it's a horrific thought, but apparently certain IT consumers also want to get involved in video editing, DVD playback and other assorted visual tomfoolery. And there is one video card that's synonymous with giving users this ability at a fraction of the cost of professional versions – the ALL-IN-WONDER series from ATI.

While it's a shame that the first of the new AIWs doesn't use the high-end RADEON 9700 PRO chipset, the move to the mid-range RADEON 9000 chipset makes total sense from a purely business standpoint, as this card isn't targeted at the frame rate whores. And besides, the RADEON 9000 is proving to be a worthy opponent to NVIDIA's GeForce4 MX series, offering

enough speed to play most games well without having to pay upwards of \$500. However, for those of you who demand the ultimate in performance keep your eyes peeled for the upcoming 9700 PRO AIW. We've already reviewed the RADEON 9000, so this is a look at the additional features found on the AIW version of the card.

When it comes to features, you couldn't ask for much more from this card. The new THEATRE 200 chip offers higher quality video-out and DVD playback than the previous version; and there's also an analog Philips TV tuner on board, the quality of which is fairly good, but not quite as high as Leadtek's standalone offering. The list of connections present on this card is simply overwhelming: composite video, stereo audio and S-Video (all in both input and output form), DVI-I, and a DVI-to-VGA adaptor.

If you're after a video card that does more than just pump polygons on to the screen, you'd be hard pressed to find a rival to this product. It'll cost you though, over \$600 to be precise. . . but you certainly get what you pay for.

SPECIFICATIONS

RADEON 9000 PRO GPU; 64MB DDR-RAM; Philips TV tuner; composite video, stereo audio; S-Video and DVI-I.

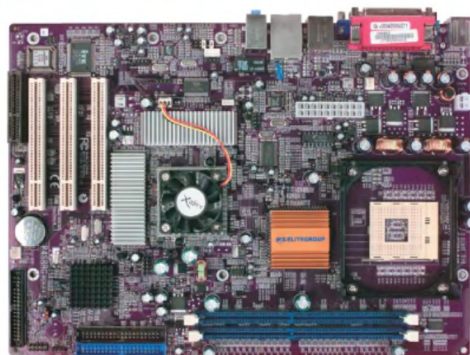
WEBSITE: Hercules www.hercules.com

SUPPLIER: Hercules www.hercules.com

PHONE: Guillemot Australia (02) 8303 1818 0 PRICE: \$630

8/10

ECS Game Union 648



When SiS proudly announced the Xabre GPU, the industry expected to see it start appearing as a killer integrated graphics chipset. Many moons, and many slippages of product roadmaps later we see the

first instance of an onboard Xabre, although not in the form we expected.

In an attempt to involve itself more in the lucrative gaming market, ECS has created the Game Union 648 motherboard. This board uses the common SiS648 chipset but pairs it with a normal, everyday, Xabre200 chip and 64MB of dedicated DDR-RAM, which is covered by two RAMsinks.

The trade off for this 'video card on a motherboard' arrangement is the loss of both the AGP slot and several PCI slots to make room for it, which decimates any upgrade paths for the board.

Xabre200 is a competent 3D performer, but is designed as the bare minimum model of the Xabre range, and is notorious for having poor texture quality and generally disappointing 2D

quality. However, one aspect of the Xabre that does stand out is its TV-out performance. In the lead up to this board arriving in the labs we had an idea that it would be a great board for a home theatre PC until we realised there was no TV-out, just a D-sub.

Which makes us wonder just what market the Game Union 648 is aimed at?

While the 3D performance is light years ahead of Intel's Extreme graphics, it would only satiate a hardcore gamer for a short while, and any of us would think twice about buying a board with no VGA upgrade path – At some point you'll want to play Doom 3 at a speed faster than one frame per second.

If gaming is irrelevant to your PC usage then it is tempting, but the i845GE is a much better option chipset-wise – and you don't lose half your mobo real-estate in the bargain.

While the concept is intriguing and the purple motherboard kinda cute, the Game Union 648 keeps falling just short of providing a capable solution for different PC users, making us wonder why anyone would bother?

SPECIFICATIONS

SiS648 chipset; Xabre200 GPU and 64MB dedicated DDR-RAM; USB 2.0; IEEE 1394; two DDR slots; three PCI slots.

WEBSITE: ECS www.ecs.com.tw

SUPPLIER: TBC

PHONE: N/A PRICE: TBC

3/10

Monsoon Player 9 Audio System



You gotta love the blurb on packaging: 'A Truly Immersive Sound Adventure.' We were shaking nervous just opening the box. . .

The Monsoon Player 9 Audio System is a three-piece speaker set, which features a new style of speaker to 'improve' the quality of

sound production. We simply couldn't wait.

Precariously named 'dipole-radiating thin profile satellites', These babies replace traditional magnet-driven speaker cones with tech-licious sounding 'Level 9 PFT™100 Series Planar Ribbon Transducers'. Apparently, they produce better mid- to high- tones, and the sound radiates equally front and back and provides notably clear, wide and accurate stereo separation.

Testing across a range of music types, including classical, hard rock, some doof-doof music and a DVD or two, we were somewhat impressed by these speakers. While the mid-range tones at higher volumes sounded a little harsh, the high-end was clear and sharp, with barely any distortion at extreme loudness. We were quite surprised with the volume these speakers were able to pump, so much so that we were looking apologetically at

our neighbours. The dual-coil, 6½in subwoofer, with a flared port, provided a rich, responsive bass without being intrusive.

This speaker set also provides a wired remote. Wireless is preferable, naturally, but as this remote allows for the connection of headphones, we looked past this small failing. The remote provides a volume control, a subwoofer control for bass levels and a mute button. Apart from the bass control, there are no other equalisation settings. Any such adjustments would need to be taken care of at the sound source.

These speakers are quite capable, except for the slightly high price tag. However, we would like to see a 5.1 version. . . Otherwise, this system is still a respectable 2.1 solution – when played at reasonably healthy volumes. There are better sounding speaker systems to be found within this price range, but the innovative satellite transducers make these speakers quite special, and a technology you are likely to see more of. We do recommend these speakers to those looking to upgrade their aging stereo or 2.1 PC speakers. Although not cheap, they're a decent solution for those who enjoy listening to stuff. □

SPECIFICATIONS

Satellites 19W RMS each; subwoofer 2x19W RMS;
frequency response: 40Hz – 20kHz.

WEBSITE: www.monsoonaudio.com

SUPPLIER: QTD www.qtd.com.au

PHONE: QTD (02) 8923 2533 PRICE: \$239

8/10

Apacer Audio Steno



The rapid decline in flash memory prices has helped make devices based around these as popular as Anthrax vaccinations in the Middle East. The Apacer Audio Steno is one such product, which packs the functionality of an MP3 player, USB memory stick and voice recorder into one slick, thin and slim package.

We've got a sneaking suspicion that the Audio Steno is manufactured by the exact same company that builds the Targa TMU-306, reviewed back in *issue 25* of *Atomic*, but with a slightly different chassis. This is because it has exactly the same features and functions as the Targa unit, right down to the information displayed on the LCD readout. Hell, it even comes in the same distinctive box that the Targa unit ships in, so we're positive that they're identical products.

Another reason we're convinced this is the same player as the Targa is the very average sound quality. Fortunately, it appears this is mostly due to the shoddy ear buds that are included. If

you do purchase this player, do yourself a favour and throw the ear buds straight into the trash can. In fact, burn them – they deserve it for being so crapola and holding back an otherwise decent MP3 player.

The unit, just like the Targa, has a generous serving of memory for the storage of your tracks – 128MB worth to be precise. When you're sick of listening to toons, remove the cap off the end of the unit and plug it straight into one of your PC's USB ports, and voila, you now have a memory stick. In fact, the simplest way to copy songs on to this player is to jack it straight into a PC USB port and copy and paste tracks directly into the MP3 player. Move along – no Digital Rights Management to see here folks. Thank God. The digital voice recorder provides decent quality audio, and you'll be able to squeeze 10 hours of voice onto the player if you haven't got any other data using up the 128MB of memory.

Unfortunately, there is one major difference between this player and the Targa – the Audio Steno costs \$50 more. As a result, we'd have to recommend you go for the Targa before looking at the Audio Steno, but it's still good value for money. □

SPECIFICATIONS

128MB of memory; MP3 and WMA support; voice recording; USB compatible.

WEBSITE: Apacer www.apacer.com

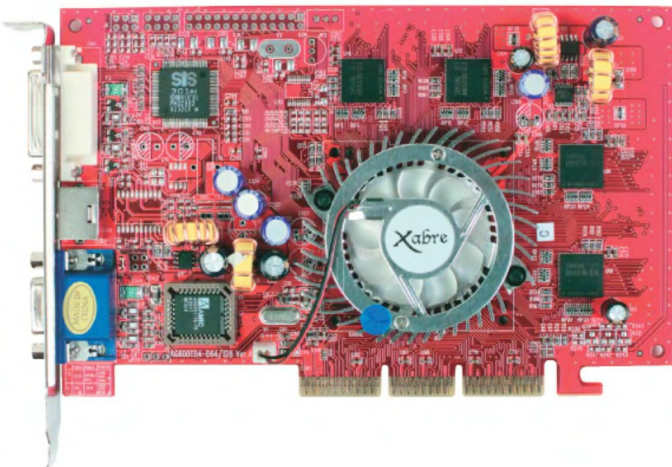
SUPPLIER: Bluechip Infotech www.servex.com.au

PHONE: Bluechip Infotech (02) 8745 8400 PRICE: \$299

7/10

ECS Xabre 600

Bennett Ring felt the need to rattle his Xabre. Mind your face.



The Xabre series, launched by SiS in the last half of 2002, promised so much and yet delivered so little. It was SiS' chance to regain some streetcred, but poor performance and even worse image quality left it chewing on the PCB dust left by its NVIDIA and ATI rivals.

We were supposed to see the Xabre 600 in Q3 2002, yet samples of the card have only now become available. And when a card gets pushed back this far, it's usually not a good sign.

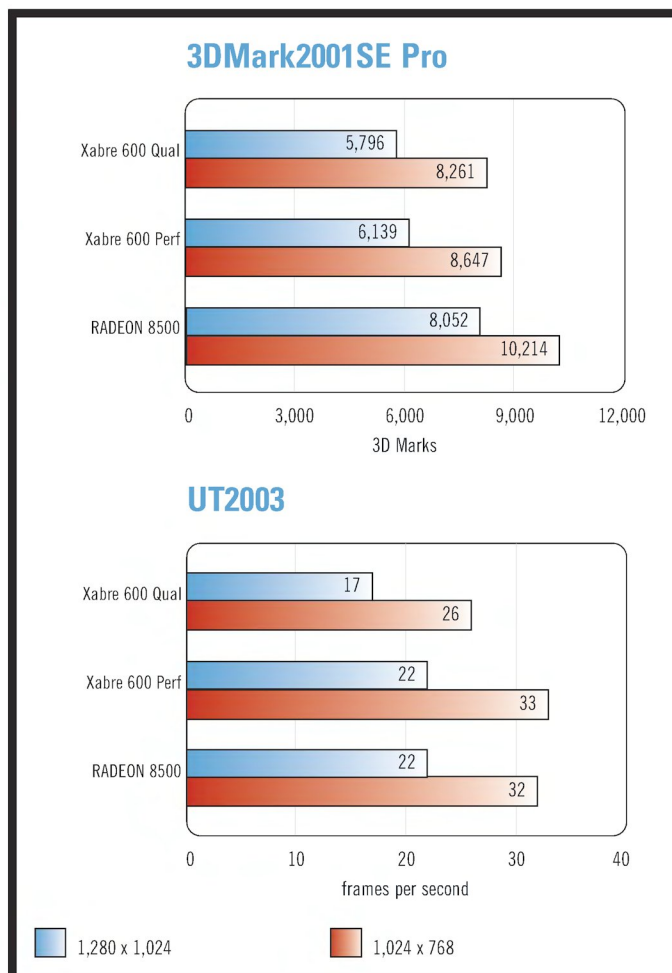
The Xabre 600 has some very interesting technology, and in fact leads the opposition with the first 0.13-micron video card on the market. Hell, even NVIDIA couldn't get its 0.13 product out earlier, so it shows SiS has nailed the 0.13 production process at its own fab plants. Thanks to this, SiS is now bandying about the idea of contract manufacturing for other companies.

One of the stranger technologies employed by the Xabre 600, and common across all of the Xabre range, is the Vertexilizer engine. It's basically a cut down vertex engine that relies on the user's CPU for certain operations, and according to the SiS whitepaper '... the GPU will process most of the runtime instructions; except and only for some minor operations which were much more efficient by the CPU.' With this in mind, we tested with a P4 3.06GHz CPU, as we didn't want the Xabre 600 to have any excuses that it was held back by a slow CPU.

SiS has gone to town in the buzzword department. Duo300 sounds like some kind of super condom – instead, it refers to the memory and core speeds, which run at 300MHz (being DDR-RAM, the memory has a theoretical speed of 600MHz). Pro8X8 isn't some kind of new extreme sport involving eight-wheeled vehicles, it just means the card has 8x AGP and DX 8 support. The Pixelizer engine is simply the DX 8 pixel shader, while Xmart refers to the dynamic contrast balancing and core speeds.

We put the Xabre 600 to the test in a grunty 3.06GHz P4 system, with the MSI 845PE Max2 motherboard and 512MB of DDR-RAM. Yes, these are faster components than our usual testbench gear, but as explained above, due to the reliance of the vertex shader on a decent CPU we thought we'd help it out as much as possible. To see how the Xabre 600 compared to a similarly priced component, we also benchmarked a RADEON 8500 with the new ATI Catalyst 3.1 drivers. DirectX 9 was used for all testing, as was Windows XP with Service Pack 1.

Take a quick look at the graphs and you'll see immediately that



the Xabre 600 just can't compete with the cheaper RADEON. In 3DMark2001SE Pro the gap between the two hovers around 20% in the RADEON's favour at 1,024 x 768, which blows out to around 30% at 1,280 x 1,024. You'll notice the Xabre has both performance and quality settings – and let it be said that the texture quality in performance mode is shocking. In fact, it's even fairly bad in quality mode, at least when compared to the excellent image quality of the RADEON.

The UT2003 results don't look as bad until you realise the Xabre can only keep up with the textures set to extreme ugly mode. Turn these textures back to a decent level and the Xabre trails behind the RADEON.

When you remember a RADEON 8500 is actually cheaper than the Xabre 600, only a total and utter sadist would ever consider this product. Sorry SiS, it's back to the drawing board for the Xabre architecture. . .

SPECIFICATIONS

DirectX 8 compatible; 0.13-micron process; 300/300 core/memory speeds (memory 600MHz effective).

WEBSITE: SiS www.sis.com

SUPPLIER: TBC

PHONE: TBC PRICE: TBC

5/10

AGP 8X

Graphic Card

WinFast CINEMA BOX upgradeable

AGP 8X

& Motherboard



A180 / A280 Graphic Card



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FSB333

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Hitachi CML174SXW



While TFTs are undoubtedly sexier displays than the gargantuan CRTs that have been stealing our desk space since the year dot, there still aren't many hardcore gamers who have made the switch to the anorexic side. It's all because of pixel response times and native resolutions. Until now, TFTs have had pixel response times around the 26-30ms range, causing a blurring effect in fast-moving games.

And their native resolution of 1,024 x 768 simply can't compare to the higher resolutions offered by CRT monitors. Oh yeah, the fact they cost around double the price of an equivalent CRT monitor hasn't helped their cause either. But gamers are set for a shake up with the imminent release of ultra-low pixel response time and higher resolution TFT monitors from several high profile manufacturers. The Hitachi CML174SXW is the first of this new breed, and we love it.

While other reviewers would be happy to run a five-minute DisplayMate benchmark and base their review on the results, as Atomicans we felt it was our duty to spend at least five or six hours playing real games on this monitor. Up until then, we'd been firm in our stance that TFTs totally suck for gaming.

Not anymore. . .

Thanks to the 16ms pixel response time of this monitor, blurring is almost a thing of the past. We say *almost* because we noticed a tiny bit in *Battlefield 1942*, but it is a vast improvement over TFTs we'd seen before. Raven

Shield and RTS games exhibited absolutely zero blurring, as these have a slightly slower pace than the frantic *Battlefield*.

Desktop quality was absolutely amazing, with the 400:1 contrast ratio making the monitor measurably brighter and clearer than even our beloved CRT monitors. The RADEON 9700 PRO – the current card of choice – has a sweet spot resolution of 1,280 x 1,024, which happens to be the native resolution of this monitor. Talk about a match made in heaven.

If there is one thing that is going to hold you back from purchasing this monitor, it's the price. At \$1,199, it's certainly not cheap, but it's worthwhile remembering that a 17in TFT has almost the same viewing area as a 19in CRT.

If you hadn't noticed, we were very impressed with this TFT, to the point where many of the *Atomic* staff members are now seriously considering making 'the switch' – to TFTs, not Macs. ☐

SPECIFICATIONS

17in display; 16ms; 1,280 x 1,024 native SXGA resolution; 400:1 contrast ratio; 260cd/m².

WEBSITE: Hitachi www.hitachi.com

SUPPLIER: Hitachi www.hitachi.com

PHONE: Hitachi (02) 9888 4100 PRICE: \$1,199

9/10

Thrustmaster 5.1 sound system



Guillemot brought us the Hercules XPS-210 and XPS-510 speaker sets, both representing great value for money with sub-\$200 price tags, considering the quality of the sound. This new offering from Guillemot appears under the Thrustmaster banner, and is aimed specifically at the console gamers and home cinema buffs.

Bearing an uncanny resemblance to the XPS-510 Hercules speakers [the packaging even bears the Hercules logo], the Thrustmaster 5.1 sound system is equipped with an external control unit, which contains a full Dolby Digital AC3 decoder, and supports Dolby Digital, Dolby Surround, Dolby Pro Logic and Pro Logic II. It also has S/PDIF optical and coaxial digital inputs, as well as RCA analog inputs. There is no direct connectivity for PC sound cards – you'll need adaptors if you want to do that – but as Guillemot points out, these speakers are not aimed at PC users.

Setup was straightforward, with a G9 connection from the control unit to the subwoofer. The control unit automatically detects the presence of various sound signal types. There are no real equaliser controls, except for the bass levels on the subwoofer, which we needed to max out. Also supplied is a remote control, allowing for the volume control of each speaker, and the standard system controls.

The sound quality was great, as it was for the original XPS range: the high tones were clear but not harsh, and mid-tones were full of depth. We noticed, however, that the bass didn't pack the punch we expected. Even when watching the opening sequence to *Armageddon* on DVD, while the full 5.1 positional audio was convincing and 'cinematic' in atmosphere, the rich rumblings of a decent bass sound were lacking.

A different experience was to be had when jumping into some hard and fast GameCube action – the speakers provided some of the best sounding console gaming we have experienced for a system in this price range. This system is a great offering from Guillemot and at a reasonable price to boot. ☐

SPECIFICATIONS

Total Power 900W PMPO (60W RMS); satellites: 8W RMS; subwoofer: 20W RMS.

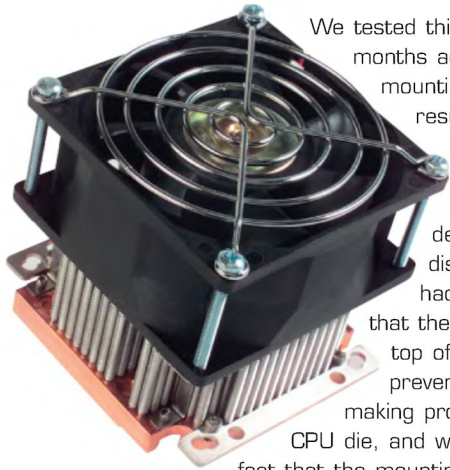
WEBSITE: Thrustmaster www.thrustmaster.com

SUPPLIER: Guillemot Australia www.guillemot.com.au

PHONE: Guillemot Australia (02)8303 1818 PRICE: \$399

8.5/10

SwiftTech MCX 462+



We tested this HSF a couple of months ago, but thanks to its mounting mechanism, our results came out much higher than expected. At the time we put it down to shoddy HSF design, but we soon discovered exactly what had occurred. It appears that the four rubber pads on top of the Athlon CPU prevent this HSF from making proper contact with the CPU die, and when combined with the fact that the mounting mechanism caused the motherboard to warp badly and make the contact even worse, it's no surprise that it didn't perform superlily duperly well.

So we've removed the rubber pads and reinforced our motherboard with a steel plate – factors you might like to consider if you purchase this HSF. Thanks to these small tweaks our Chernobyl results are much more accurate for HSFs that use the mounting holes on Socket A motherboards.

For the retest, we set Chernobyl to pump out 100W of heat, which is about as high as an overclocked high-end Athlon XP. The

Thermalright SLK-800 was also retested for comparison, and ambient temperature was a constant 21°C. A Delta EF80812HHE 5,000rpm 60cfm fan was mounted to both HSFs, removing the variance of different fan types.

While the uber SLK-800 reached a maximum temperature of 48°C, the SwiftTech came in at a single degree hotter at 49°C. Very impressive.

Unfortunately, we're still not happy about the mounting mechanism. Because the user has to screw the four mounting screws down at exactly the same tension, there's a high chance of doing one too tight and placing pressure on a corner of the Athlon die – so you'll be slowly killing it.

The Thermalright SLK-800, with its standard HSF clip, shows that designers needn't go to such lengths to extract better performance out of its HSF. And the Swiftech is also much larger than the SLK-800, making it less suitable for those with crowded CPU sockets.

Having said that, the MCX 462+ does offer top shelf performance, regardless of a couple of minor flaws.

SPECIFICATIONS

Hybrid Copper base; Helicoid pin design; can mount 70mm or 80mm fan; Socket A-compatible.

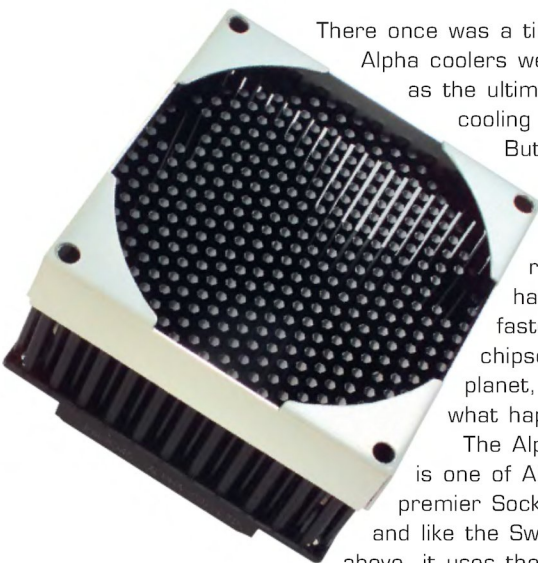
WEBSITE: SwiftTech www.swiftnets.com

SUPPLIER: PC Cooling Australia www.pcca.com.au

PHONE: PC Cooling Australia (03) 8711 8484 PRICE: \$100

8/10

Alpha PAL 8045



There once was a time when the Alpha coolers were regarded as the ultimate tool for cooling your CPU.

But there was also a time when 3dfx was well regarded as having the fastest video chipsets on the planet, and look what happened to it?

The Alpha PAL8045

is one of Alpha's premier Socket A coolers, and like the SwiftTech model above, it uses the four holes

around the socket for mounting. This is why our test results for the Alpha from the HSF roundup in *issue 23* of *Atomic* turned out much higher than they should have.

Again, this is a HSF that required we remove the rubber pads on top of the CPU to make proper contact with the die, and a little reinforcement of the motherboard to stop warping didn't go astray either.

As stated in the SwiftTech review, we're not a big fan of

this type of mounting mechanism, as it appears to offer a simpler way to trash your CPU than the traditional socket clip. Better ways to kill your CPU – it'd make a great book.

It also results in a much larger HSF than is usual, which shouldn't be much of a problem for those who bother to measure how much space they've got to play with around their CPU socket.

The Alpha was retested at the same time as the SwiftTech MCX 462+ and Thermalright SLK-800, with the same Delta fan.

As with the above heatsink, ambient temperature was a constant 21°C. While the Swiftech and Thermalright peaked out at 49°C and 48°C respectively, the Alpha rose to a maximum temperature of 54°C, which is quite average considering its competitor's temperatures.

When you consider that this HSF costs around \$10 more than the Swiftech unit and doesn't perform as well, we'd be hard pressed to recommend it to anybody. Combine this with our lack of lovin' for the mounting screws, and the Alpha is left out in the cold.

SPECIFICATIONS

Hybrid Copper base; fan not included; unique pin design; usable with Socket A motherboards.

WEBSITE: Alpha www.micforg.co.jp

SUPPLIER: PC Cooling Australia www.pcca.com.au

PHONE: PC Cooling Australia (03) 8711 8484 PRICE: \$110

6.5/10



Antec LANBOY



If a sport's popularity is measured by the number of active players, rather than spectators, then the increasing number of community halls stacked to the brim with unwashed gamers is proof that LANning is moving into the big time. It's not quite so popular that the TV networks plan to scrap the cricket in favour of broadcasting the latest State of Origin Counter-Strike finals, but it's fashionable enough to have spawned its very own case – the LANBOY, by Antec.

What makes a case LAN-tastical?

Firstly, it has to be lightweight, and this case certainly fits the bill in this regard. Due to the entirely Aluminium construction, and its slightly smaller dimensions than a standard full-sized tower, the LANBOY weighs a measly 4.9kg, making it light enough for even the most protein-starved gamer.

It feels a little flimsy, but not so much that we'd worry about it falling apart. A nice touch is the included carry strap, which wraps snugly around the case, making it much easier to cart around.

A LAN case also needs a lovely Perspex window to show off where your pimp dollars have gone for the last year, so it's no surprise to see the LANBOY has a large Perspex side window pre-fitted. There aren't many mounts for extra cooling, with a single 80mm mount at the front and rear of the case, but this should be enough for all but the most superheated of systems.

The included 350W PSU has a variable-speed cooling fan that automatically ramps up in revs as the temperature within the PSU rises, and drops back down to whisper quiet levels when things are nice and cold. Nice. There is also a blue LED mounted within the power supply for those of you with a taste for disco PC cases.

Perhaps the most amazing feature of this case is its price. Show us another case made entirely from Aluminium with a window, carry strap and PSU that retails for less than \$200 and we'll show you a product that exists only in Never Never Land. Due to this exceptional value we recommend the LANBOY for your next State of Origin match. □

SPECIFICATIONS

Mini-tower case; windowed side panel; SmartBlue 350W PSU; 4.9kg.

WEBSITE: Antec www.antec-inc.com

SUPPLIER: Altech www.altech.com.au

PHONE: Altech (02) 9735 5655 PRICE: \$190

9/10

Thermaltake Xaser III V1000C



Without doubt this is the heaviest bloody PC case we've ever strained our fifth vertebrae attempting to lift. Seriously, it feels as if a Lead alloy is the primary metal in its construction. It isn't quite server tower size, but it's bigger than your standard tower case, although even that can't account for the overall chunkiness of this beast.

This super heavy weight of 17kg could be a result of the various gadgets that have been squeezed into the chassis. First up are the seven – yes that's seven – 80mm fans pre-installed

throughout the case. Two at the front,

two at the rear and one on top are all fairly cool, but we really appreciate the two mounted on a tricky little side mount over your PCI slots and CPU, especially as our toasty RADEON 9700 PROs have given us grief during the scorching Australian summer. You might expect seven fans to rival the noise levels of a squadron of B-52s taking off, but these suckers are so darn quiet you won't hear a thing. The downside is that they spin at a measly 2050rpm and therefore don't move a great deal of air.

Each fan also has its own filter, helping to keep the interior of your case cleaner than the home of an obsessive compulsive.

In the event you have the hearing of Daredevil and want these fans quieter, Thermaltake has kindly preinstalled a Rheobus with controls for four fans. An LCD display hooked up to two temperature probes is nestled with the fan speed knobblies, allowing you to monitor a couple of hot spots within your case. Unfortunately the temperature monitor doesn't have anywhere near the functionality of a dedicated monitoring device such as the awesome *Lost In Space* device we reviewed in *issue 25*.

One cool feature we appreciated is an I/O port mounted on top of the case, with connections for USB, FireWire, headphones and a microphone.

While most of this case's features are fairly cool, there's one thing we thought blew major league chunkage: the word 'Thermaltake' runs down the front of the case, and has an LED mounted behind it, turning your PC into a glowing billboard for Thermaltake products. If it wasn't for this extremely tacky self-pimpage, the Xaser III could have been Hot Award material, but this excessive branding drags it down a little. □

SPECIFICATIONS

17kg; 12 drive bays (eight 3.25in, two 3.25in and six 3.5in); PSU not included.

WEBSITE: Thermaltake www.thermaltake.com

SUPPLIER: Anyware www.anyware.com.au

PHONE: Anyware (02) 9879 5788 PRICE: \$369 w/out PSU

8/10

VideoLogic

by PURE Digital

Now includes wall mounts!
(Optional stands and extension cables also available)



The best all-round 5.1 speaker set just got better!

ZXR-550

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With 65W RMS of power, the Videologic **ZXR-550** is the perfect companion to any 5.1 sound card or DVD player. Enjoying movies with 5.1 channel sound, hearing the footsteps of opponents as they come from behind you or just listening to your favourite music, the **ZXR-550's** are sure not to dissapoint.



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artomic

Ready For Action by Jake Stollery: The one thing most prominent, and for many, important, to games is guns! Big ones with plenty of bang or at least look futuristic and cool. As such, a concept was spawned. Presentation and look were derived from the abstract style that has become so popular. I set off modelling the gun in Lightwave 7 Modeller, using the images I had in my head inspired by all the funky looking guns I've seen in both movies and games. Then it was off to Photoshop 7 to add all the renders and details together - wireframes, text, and colour. Create the winning Artomic and win the latest version of Indesign and Acrobat from Adobe! Email a preview (no larger than 5MB) of your games or hardware themed masterpiece to artomic@atomicmpc.com.au.



do you love your guns?

godp
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I GAMES I

Death to Counter-Strike

'NUMBERS. . . NUMBERS, TOO MANY NUMBERS. MUST PLAY OTHER GAMES. WIBDY-BLARG!' BENNETT RING'S BEEN INSANE ALL MONTH.



When this article was written, there were 78,973 Half-Life gamers playing on 27,899 servers around the world (according to GameSpy's server statistics tracking service – www.gamespy.com/stats). And you can be sure that the majority of these players were bunny-hopping around bombs, or bustin' a cap in a terrorist's arse in Counter-Strike.

Compare this huge amount with the next most popular game, Battlefield 1942 with its 7,565 players on 1,625 servers, and we can see straight away that something just isn't right.

In a perfect gaming world, there shouldn't be ten times as many people playing the most popular online shooter compared to the next most popular. It should be a much narrower gap, but this simply isn't the case – Counter-Strike continues to dominate online first person shooters. And this is not a good thing.

I can feel the flames already. . .

Don't get me wrong, I spent two of the finest years of my gaming life hooked on CS, starting all the way back in Beta 2. It was one of the few games that prompted me to go and buy a new CPU and video card. And yet, regardless of how many breath-taking head shots and multiple grenade kills I've scored in my past, I can't help but bear a grudge with the game.

There are a variety of reasons why CS is hurting gamerkind. Most importantly, when a game gets this popular, it's bloody difficult for another multiplayer game to sell well.

Just take a look at the stats above – Battlefield 1942 is a vastly superior game in technological and gameplay terms to CS, and yet it only has a seventeenth as many servers. The same complaint has been made by developers about GTA3: Vice City – when a game gets as popular as this title, other game companies have a hard time selling

games, and in the cutthroat world of game development one flop can doom a company. This might sound a bit whiny, as we need games of this quality to spur other companies into releasing even better titles. Unfortunately when a game has dominated for so darn long by pandering to the lowest common denominator, it ends up stifling innovation.

CS and the other HL mods could even be said to be slowing down the rate at which gamers upgrade. It's played on a four-year old game engine, meaning gamers don't need an uber PC to get their online fix.

This is probably one of the reasons that it has proven to be so popular. CS was also one of the first games to use client-side prediction, making for a smoother dial-up experience. Counter-Strikers are less likely to feel the need to upgrade to broadband.

Expect to see some dumbed-down multiplayer first person shooters in the near future due to the inherent simplicity of CS. America's Army is a fine online shooter, and yet there are only two servers in the whole of Australia. Could it be that most gamers, having been raised on the simplicity of CS, find the deeper and more complex gameplay of AA a little overwhelming?

After developing an addiction to Raven Shield while reviewing it this month, with withdrawal symptoms to rival those of a crack addict going cold turkey, I can only hope the same doesn't occur to this stunning shooter.

A few billion people out there are going to disagree with this viewpoint, which is why we have the forums (www.atomicmpc.com.au/forums). Go ahead and unleash your wrath on my opinion. I dare you.

On a totally unrelated note, I've come up with a nice little theory about accents. Within a couple of years, maybe five at

the max, you're going to be able to tell who plays multiplayer games simply by hearing them speak. Let me explain. . .

Xbox Live is a truly global multiplayer network due to the awesome Net coding present in most games, which manages to hide high latency. And it just happens to have voice in every game.

I've noticed something very disturbing when I'm playing with a group of Yanks or Brits – within minutes I have started to mimic their accents. 'Arse' becomes 'ass', and before you know it 'Hey guys' becomes 'Wass-up my nigga?' You know things are getting really freaky when 'I need to get some petrol' becomes 'Let's invade Iraq.' Most Aussies who have played on Xbox Live have noticed the exact same thing, so it's not just me being easily influenced.

You'd think this sort of accent change would have happened by now due to the vast amount of US television shown in Australia. However, it's not until you're actually speaking to a group of foreigners that you'll notice your accent starting to change. It's an odd experience.

We all know that multiplayer is The Way of the Future™, as are voice communications, so it's only natural that every gaming platform is going to end up having you playing and chatting with a global audience. So Aussie gamers are naturally destined to inherit one of those bizarre country-less accents like Elle McPherson.

It's not Aussie, it's not American, it's not British; it's a wierd amalgamation of them all.

This is going to make it even harder then ever before to hide your gamer-side from a prospective partner. When you pipe up with 'G'day mate, wot kinda geezer are you looking to rock da crib with? Word up.' Your date will no doubt run in sheer terror the moment it passes your lips.

C&C Generals

'Smoke me a kipper, I'll be back for breakfast!' orders Logan Booker.



ABOVE: The little effects, such as tank tracks in the snow, make all the difference.



ABOVE: Troops are now genuinely useful, and will see just as much action as vehicles.



ABOVE: No more harvesting – instead, you need to capture and hold supply platforms. Crates for all!

Shelling is fun. So is caustic smoke. Combined, they're awesome, but coupled with a collapsing building full of screaming troops, it's worthy of a shrill, maniacal squeal. All these elements are present, abundantly, in C&C Generals, where you get to total your enemies in full 3D – a first for the series. Generals also happens to be the last title that'll be produced by Westwood under its familiar moniker, with the studio adopting a name change to EA Pacific. We're not sure why – it just is.

And maybe this is why Generals has an entirely different feel to previous C&C games. The look is more pleasing and the smell of dust and diesel is unerringly powerful – from the main menu, with its pseudo-battle waging in the background, to the untiring gameplay packed with exploding MiGs, tanks and bombs, Generals is a considerably meaty title.

Receiving first mention is the graphics and sound, which are top-notch for an RTS. Tanks, hummers and artillery are chunky, and rock when doing anything remotely vehicular. Deeply satisfying are the sweet particle effects that animate combats, as are the booming sounds that erupt as units engage one another.

An exception are infantrymen, who must have missed out on 'Detail Day'. Even on a bleary Sunday morning, troops are plain, with basic colours representing different body parts. Rifles and guns for instance, are simple grey oblongs. Yuk.

The game departs from other C&C titles like a flaming F-15 from skies dominated by crap

motion video and even stinkier acting. Well, the FMV is dead, replaced by basic animations, such as those used to crudely describe which hellhole is your next destination, and bland-looking text for mission objectives. It doesn't take a master thinker confronted with this sort of information to realise that the focus of Generals is purely multiplayer.

Single-player comes off as being the last item on the to-do list during the game's development. A consistent story is AWOL, and the generic theme of 'The World vs. Terrorists' is whacked painfully into submission.

Also dropped is the deluge of sides. Well, not really sides, more like variations. The original Red Alert 2 had two main sides. Special units and abilities were divided by country, but in every circumstances, you were a subset of US or Russia. Generals has refined the choice of disgruntled nations to three: the USA, China and the Global Liberation Army (GLA), which really isn't a nation. Maybe that's why it's angry.

Each side caters to a certain play style. Sure, you can try other strategies, but stray to far, and the developer will show you who's the boss. The USA, for instance, relies on its maneuverability and raw ability to get supplies during mid- to end-game, while China has the infantry rush and tank rush to procure a victory. These strategies are echoed in the single-player game, which is really just a long-winded tutorial for online play.

And to spruce up said online play, EA

Pacific has implemented a 'Generals' system of advancement. The game knows when you're attacking and defending, and rewards more experience to aggressors. Once enough is accumulated, you can spend a 'star' to get yourself an advantage, such as an off-map artillery strike or new unit type. Each side has its 'ultimate' ability, with China, for example, getting an EMP blast that disables all buildings and vehicles in an area.

A welcome change from previous games is *useful* infantry, and a culled choice, which is now limited to a rifleman, a rocket troop, and two special units. Rocket troops can now successfully fend off a tank rush, and the unique units are *actually purchased*, and it's great to see the variety of units slugging it out in battle, and not just one big-arse tank. (Or 100 of them. . .)

In its wholeness, Generals is a very enjoyable RTS with a nice, familiar theme, and although it leans on the C&C formula, there's enough newness to bring old players back who've been converted by recent titles. The only real downfalls of the game are its single-player, which frankly has no excuse being there, and the lack of 'instant appeal' – it's one of those games you have to *really* play. □

9/10



GAME DETAILS

- **FOR:** Excellent side balance; nice graphics for an RTS; Generals advancement system.
- **AGAINST:** Awful troop graphics; plain C&C style; single player should have been abandoned.

REQUIREMENTS: 800MHz CPU; 128MB RAM; 32MB GeForce2-level card; DirectX 8.1.

RECOMMENDED: 1.8GHz CPU; 256MB RAM; 64MB GeForce3-level card.

DEVELOPER: EA Pacific www.ea.com

PUBLISHER: Electronic Arts www.eagames.com.au

DISTRIBUTOR: Electronic Arts www.eagames.com.au

PHONE: Electronic Arts (02) 9264 8999

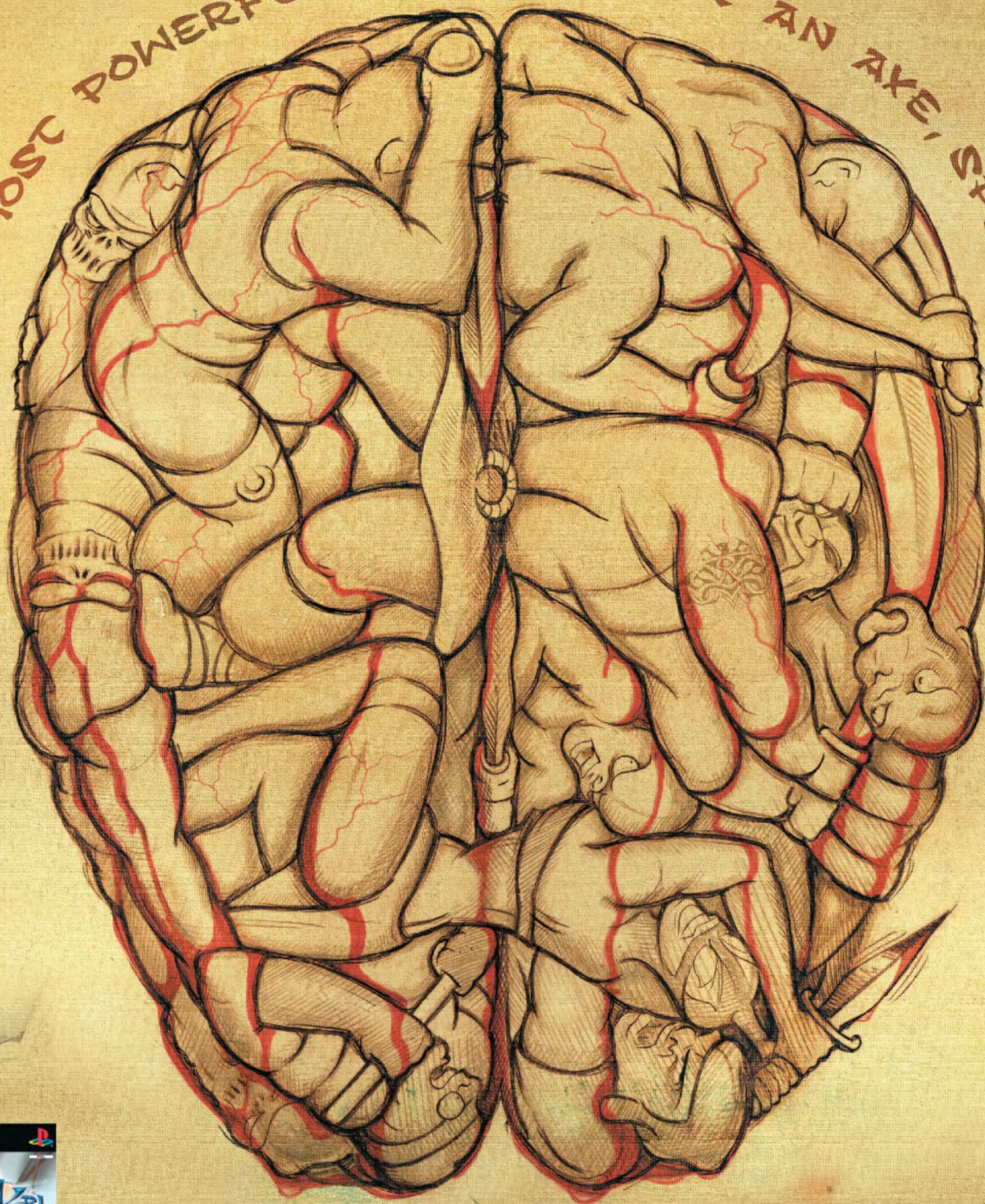
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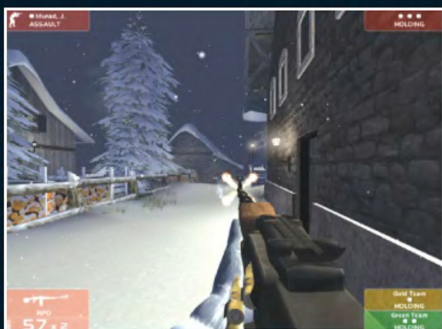


THE FEROCIOUS PLACE THE STEALTH PLACE THE THIRD PLACE

PlayStation.2

Rainbow Six 3: Raven Shield

Fight the 'War on Terror' with Bennett Ring. Go, go, go!



ABOVE: Firing HMGs from the hip isn't a terribly amazing idea. Unless you like shooting at clouds.



ABOVE: Outnumbered terrorists prefer to surrender, rather than receive some loving from a FAMAS.



ABOVE: Team AI is exceptional, with each member covering a separate area with his or her weapon.

Being the third generation of the Rainbow Six series, Raven Shield has the benefit of years of tweaking and refinement behind it. It's not just a simple expansion of the original game – every area has been polished to a sheen like that on a SAS trooper's knife.

For those of you who haven't played an R6 game, here's a brief rundown on why this isn't just another FPS. Even before the shooting bits, you'll have to plan each mission – a process that can take longer than the action phase. After checking out the mission briefing you're presented with a list of operatives, each specialising in different areas such as assault, demolitions, leadership, and sniping. You can choose up to eight members, which can be split up among one to three fire teams. Each operative has a detailed military history, and as they progress through missions their skills will increase as they gain experience. You'll quickly become attached to certain characters – professionally, of course.

Once you've selected your troops, it's time to kit them out. With more guns than a Branch Davidian safe house, Raven Shield packs over 50 different real world weapons, all with gorgeously crafted first person models – something not seen in a Rainbow 6 title. Easily the coolest of these are the explosives – door breach charges, tear gas grenades, concussion grenades, and Claymore mines. There are also some funky gadgets, such as heartbeat sensors and gas masks to help you out in those pantsy situations. Like multiplayer.

Using a 2D map of the mission area you can place waypoints and orders, to trigger teams to throw grenades, snipe, breach doors or just hang out until you give a Go code. A new feature is the 3D camera that shows you the exact viewpoint from each fire team.

Once you're in the mission, it's time to jump into the first-person view and take control of the team. Thanks to the Unreal Warfare engine, the visuals are nothing short of scrumptious. Level detail isn't quite as high as that seen in UT2003, but characters are intricately modeled, right down to the types of grenades found on their belts. Also impressive are the bullet and explosion effects, and the wonderful Karma physics engine makes sacking a bad guy very satisfying. And the sound effects for weapons are arguably the finest we've heard, and the implementation of EAX is superb.

Another nice touch is the ability to open doors a couple of inches, allowing you to chuck a few grenades into the room before making your entrance. This is great, until the AI notices and opens the door all the way, leaving you with a frag in your hand and no place to run. It still does the occasional stupid thing though.

Rainbow 6 finally has dedicated server support, and it appears to be stable and easy to set up. Massive thanks to GameArena (games.telstra.com/gamearena) for going to the trouble of hosting a server for our test sessions. You rock Term.

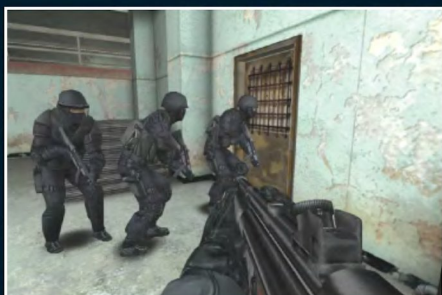
The ability to crouch, go prone and lean

around corners makes it very difficult to get a clean shot on a smart player. Co-operative mode for eight players is supported, and this is simply amazing, allowing you to play through all the campaign missions as well as terrorist hunt and hostage modes. There isn't a more tense, realistic and exciting co-operative mode available for first person shooter fans. The use of voice comms is highly recommended, allowing you to synchronise door breaches and grenade throws with your buddies.

Adversarial mode, which supports 64 players, is where it's going to be at. As well as your standard survival and team survival modes, there is pilot rescue mode, where one player is armed with only a pistol and must be escorted to an extraction point by his teammates, while bomb mode is basically the same as Counter-Strike's. CS is the preschool of military shooters however, while Raven Shield is the PhD. The gadgets, 'one shot, one kill' weapons and slower-paced gameplay make it more realistic than CS.

For gamers who have graduated from the CS school of realistic shooters, Raven Shield will be the next stage towards gaming bliss. Congratulations Ubisoft, you've delivered one of the finest shooters of the year. □

9.5/10



GAME DETAILS

○ FOR: A feast of modern weaponry; stunning visuals; an awesome single player mode backed-up by comprehensive multiplayer.

○ AGAINST: Very hard, even on the easiest level. Probably won't appeal to casual FPS fans.

REQUIREMENTS: 800MHz CPU; 128MB RAM; 32MB DirectX 8.1 compatible card.

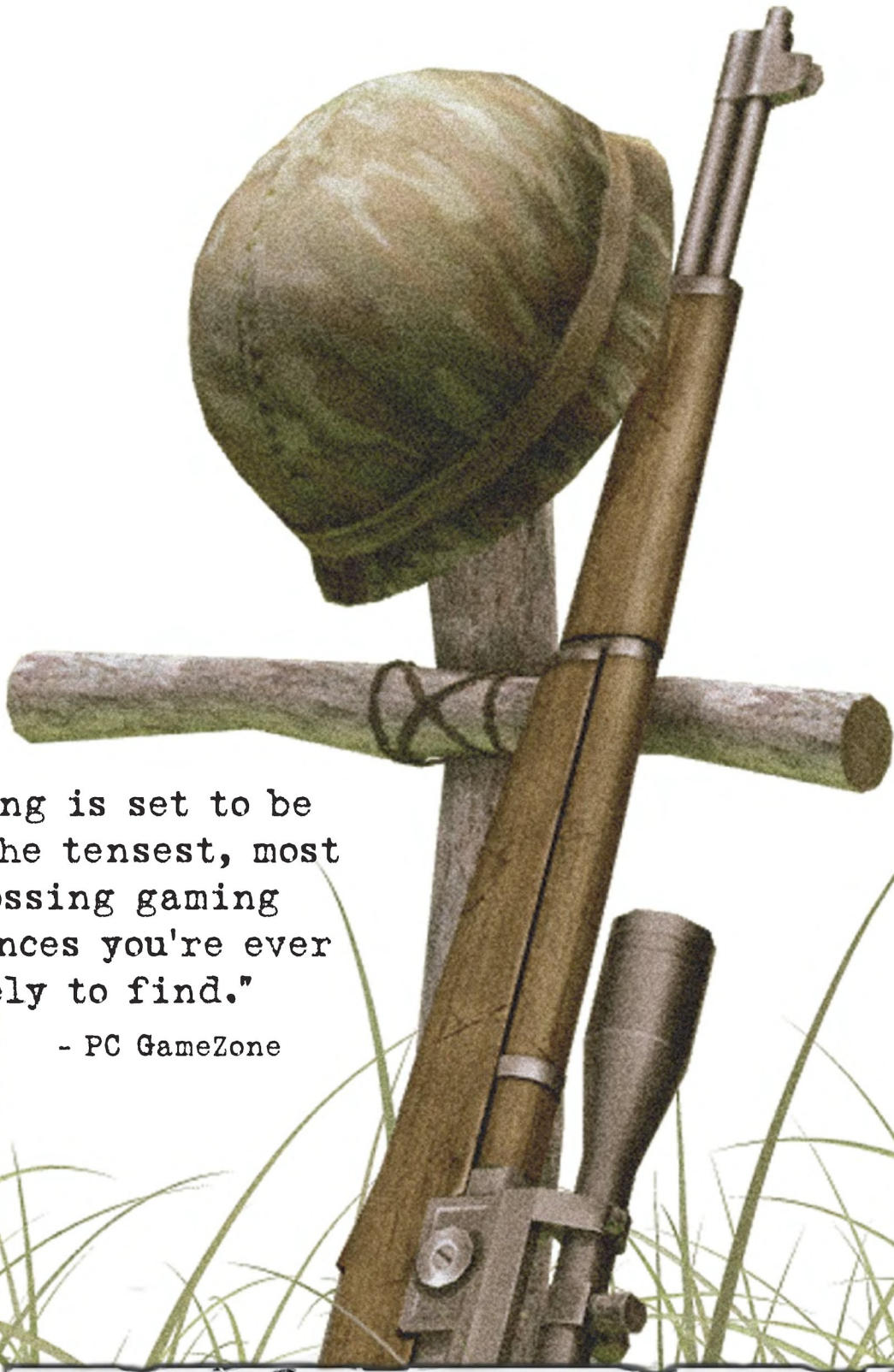
RECOMMENDED: 1.2GHz CPU; GeForce3 or better; 256MB RAM, EAX compatible sound card.

DEVELOPER: Red Storm Entertainment www.redstorm.com

PUBLISHER: Ubisoft www.ubi.com

DISTRIBUTOR: Ubisoft www.ubi.com

PHONE: Ubisoft www.ubi.com



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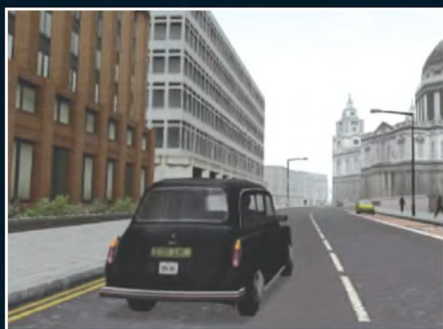
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The Getaway

IC1 male, John Gillooly, starts running from the filth.



ABOVE: Hail a cab and explore the world of The Getaway in a fairly accurate model of London. . .



ABOVE: . . . While you're doing the tourist thing, drop into Triad territory for a quick bite. . .



ABOVE: . . . If you get lost, ask a friendly local Bobby for some pointers – nice one bruvva!

It is something of a pity that Team Soho's long awaited gangster game, *The Getaway*, will be forever compared with that other title launched at the end of last year, *GTA: Vice City*. A tragedy not because *The Getaway* doesn't live up to the standard set by *Vice City*, but because there is very little similarity between the games once you scrape away the layer of superficiality.

The Getaway takes its cues from the notorious London underworld, playing itself out as an interactive movie, rather than a free form romp. It is a strongly story-driven, unforgiving and at times brutal game, loaded with guns, violence and liberal use of the more colourful words in the English language.

Over the arc of the game you play two intertwined characters. You start as a retired gangster named Mark Hammond, who is sucked back into the seedy underworld when crime lord Charlie Jolson kills his wife and kidnaps his son. Mark then ends up doing increasingly more insane jobs for Charlie as he desperately tries to save his kid.

The other part of the story is played out as Frank Carter, a disgraced flying squad copper of the old school who also finds himself entangled in the mess.

It's in its story that this game really shines, and everything is held together with some rather stunning cutscenes and missions that constantly throw up new surprises and challenges. The sheer number of twists and turns will mean you never quite know what to

expect yet, despite the game's linearity. Gameplay is basically split between two major modes: driving the streets of London and gun-fighting your way through various real world locations on foot.

Both modes are initially brutal and unforgiving as you realise you're not in *Vice City* anymore. Drive a car at maximum revs for a prolonged period and you can expect steam to appear and speed to disappear. Run out into a pack of Yardies with your handguns blazing and expect to live for a time measured in nanoseconds.

Death is one of the harsh truths you have to accept when you pick up this game: you will die, and die, and die. The more you try and play this game like other third-person action titles, the shorter you will survive. To avoid this pain you need to take things slow, making good use of cover or grabbing bad guys to use as human shields. In keeping with the interactive movie philosophy, there is no onscreen information like health or ammunition, instead feedback is provided through your character. Catch one or two bullets and you will begin to slow up and limp; get hit by more and you will clutch your side and drag yourself forward; any more hits and you will be restarting the level.

When in one of the numerous real-world cars that can be found around London this lack of onscreen display is compensated for in an unusual way. Forced into a third-person view of the vehicle, navigation through the

city is done by following the directions indicated by the car's blinkers – although someone familiar with London would probably be able to find easier shortcuts.

One of the major achievements in *The Getaway* is the fact that 40 square miles of London have been faithfully recreated for the game. It is an amazing feat, but only really translates into an enhancement of the gaming experience if you are already familiar with London. For those who aren't, then the experience can become frustrating, as there is no map in the game and you end up driving in circles wondering which little alleyway your blinkers are pointing you to.

In the end this game has the potential to strongly polarise opinion, more so than most games in the market today.

Those hungry for the fast and frenetic pace of the *Grand Theft Auto* games will most likely end up with a Dual Shock2-shaped hole in their television screens after dying quickly and repeatedly 15 seconds into the first mission. But those after a unique, compelling and challenging gameplay experience are the target of *The Getaway*, and Team Soho has done a great job of satisfying this oft-neglected area of gaming.

8.5/10



GAME DETAILS

FOR: Rich, involving storyline with great criminal elements: revenge, greed and megalomania; gorgeous visuals; and immensely challenging gameplay.

AGAINST: High difficulty level, especially when on foot; no map to consult (unless you own a street map of London already); and occasionally unforgiving damage model.

DEVELOPER: Team Soho www.au.playstation.com

PUBLISHER: Sony Computer Entertainment www.au.playstation.com

DISTRIBUTOR: Sony Computer Entertainment www.au.playstation.com

PHONE: Sony Computer Entertainment (02) 9324 9500

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Battlefield 1942: Road to Rome

'When in Rome. . .' ponders Bennett Ring, '. . . You need a bigger, stronger weapon.'



ABOVE: The new Mosquito is scarily powerful, as these bridge defenders will soon find out. . .



ABOVE: One of the new tanks doubles as a handy taxi cab for lazy infantry



ABOVE: Perhaps the standout new weapon of the game: the mounted anti-tank gun

Battlefield 1942 is an amazing, addictive and adrenaline-filled game. The huge black bags under the eyes of all the *Atomic* staff should be proof enough of how life-destroying this game has become since the 1.2 and 1.3 patches fixing the netcode were released.

In fact, I'd risk my future career as a reviewer by saying that it could well be the finest game of last year, at least for those into online first person shooters. Road to Rome is the recent expansion pack from EA and Dice for this groundbreaking multiplayer game, and it takes our virtual WWII troops into two new areas: Italy and Sicily.

The two new environments are very different to those seen in the original game. For starters, they tend to be hillier than the original, and are littered liberally with cover, such as semi-demolished homes, shrubs, walls and boulders. They also have fixed anti-tank guns, which are an absolute blast. A couple of shots from one of these is enough to turn a hulking iron behemoth into a useless pile of melting nuts and bolts with some squished-up meat in the middle.

The map makers at Dice have figured out how to make the maps even more enjoyable this time around. You'll never face another barren and unpopulated area again – an annoyingly frequent occurrence in many of the original maps. The maps are smaller though, and as a result you won't be far from the bullets and blood. Monte Cassino has the Allies storming a very narrow path up a

mountain to take over the ruins of an Axis-occupied monastery.

Standing in the Allies' way are seven or eight Axis anti-tank and machine gun nests, requiring masterful teamwork if the Allies are to succeed. The other stand-out map, Battle for Salerno, gives both sides two spawn points on opposite sides of a large hill, and two capture points on top of the hill. The nifty part is that the capture points can't be spawned from, leading to large waves of soldiers all attacking at the same time from the lower points – very cool. Another map, Operation Husky, isn't too bad playing quite similarly to the Omaha Beach level from the original. Things are a bit more spaced-out, making the Allies' task slightly easier. Unfortunately, sea battles are non-existent in the new levels, which is a shame considering how cool the boats are, as the new patches have fixed their warping problems. In fact, there is only one map that features a large boat, with no opposing sea vessels for those who like to do it in the water. Thankfully, most of the maps seem to have more tanks.

The big problem is that there are only six new maps. Considering UT2003 players were just given six new maps by the developer *free* in the DE pack, it's a travesty that gamers are forced to pay \$50 for the same amount of BF1942 maps. Now you know why EA hasn't released a map editor for BF1942. . .

Helping to balance out this severe shortage of new maps is a stack of new

vehicles and unit models. Two versatile aircraft, the Mosquito and BF-110, offer a fresh experience for pilots, dropping a cluster of three bombs, while still remaining quite maneuverable. Actually, they might be a little too powerful, allowing a couple of decent pilots to dominate the entire map.

Four new armoured vehicles are also introduced with notable differences from the originals. The two new big-arsed tanks don't have 360-degree rotating turrets, making them very vulnerable from the side and rear, while the other two are specialised vehicles. One is designed for anti-infantry attacks, the other as a mobile artillery piece, and both are a joy to deal death from.

Infantry units have also been overhauled, with the Allies as Free French Forces and the Axis being Italian. A couple of new machine guns round out the new stuff.

Regardless of what we say, BF1942 junkies will buy this expansion pack and mainline it to the part of the brain controlling gaming responses – and they're bound to have a good time doing so. We would have liked at least ten new maps and several more vehicles before we could comfortably recommend purchase of Road to Rome. □

7/10



GAME DETAILS

- **FOR:** New maps and vehicles provide excellent gameplay; and two more sides to slaughter.
- **AGAINST:** Six maps doesn't cut it for the price; and balance issues with the new aircraft.

REQUIREMENTS: 500MHz CPU; 128MB RAM; DX8.1-compatible video card

RECOMMENDED: 1.2GHz CPU; 256MB RAM; GeForce3 or better

DEVELOPER: Dice www.dice.se

PUBLISHER: Electronic Arts www.eagames.com.au

DISTRIBUTOR: Electronic Arts www.eagames.com.au

PHONE: Electronic Arts (02) 9955 7744

Mortal Kombat: Deadly Alliance

As long as there's solid gameplay, Logan Booker doesn't mind the odd disembowelment.



ABOVE: The arenas are graphically tasty, but the 'magical barrier' prevents fighters wandering. . .



ABOVE: Each character has three combat stances, which can be chained together with combos



ABOVE: The amount of blood in the game is disturbing – but that's Mortal Kombat for you!

Within the soul of many hardcore gamers lurks a creature that feeds on gore, guts and dismemberment. Such a monster is hard to keep satiated, but somehow, in this turbulent world of political correctness and extreme censorship, we, as a community, have always found a way to satisfy this curious inner beast. And for the past decade, the bread-stuffed turkey at every feast has been Mortal Kombat.

In the words of Austin Powers, it's all blood baby, and lots of it. Shagadelic, maybe, but the rich red spurts and decapitation have been a succulent draw card for many a twelve-year old. And while Mortal Kombat: Deadly Alliance keeps with this age old premise, it has also discarded much to refresh the series.

Most will be happy to know that MK:DA sheds its old skin for a new story-based one. Gone are the numerous 'fatalities' that complicated gameplay. Instead, the new game focuses on the turmoil erupting after some good old power usurping.

Deadly Alliance begins a few years after the MK 4. Liu Kang is up to his Tai Chi antics, Shao Khan graces his mighty throne with his mighty frame, and Shang Tsung and his new, pallid-faced friend, Quan Chi, form an alliance. Soon after, Liu Kang sees some neck-twisting action, and Shao Khan's rule as Emperor of the Outworld comes to a violent, sticky end. Out comes the Dragon King's army, and the deadly duo conspire to control the undead force. Narration is courtesy of Rayden, who sounds like he should be doing voiceovers for movie previews. It's a big change from the high-

pitched pseudo-Japanese of previous titles. The story is very linear – no matter who you finish the game with, their fate, and that of Earthrealm, is always the same.

Like the previous game, MK:DA is 3D. Gone are the poorly videoed actors, replaced by some nicely flavoured graphics and animation. Serious work has gone into designing and crafting the arenas, and it's pleasantly noticeable in the textures and lighting.

The game has your standard arcade and versus modes, however, absent are survival, time trial and tag team modes that appear in DOA and Tekken.

There is an original mode called 'Konquest' that lets you play through a short history of each character, and learn their major combos. It's a welcome addition, but a poor substitute for other modes.

Developer Midway has countered this with 'The Krypt' – a coffin-filled room that contains additional content such as extra characters, photos and alternate costumes. There are some 600 containers, which can only be opened by spending jade, platinum, gold, sapphire, onyx or ruby 'koins'. These are earned by fighting and 'tests' of might or sight (where you have to guess which cup a koin is hidden under after they are moved around).

Regarding fighting styles, MK:DA has almost every real world technique covered. Be it Li Mei's 'Lui He Ba Fa' style, reminiscent of *Crouching Tiger, Hidden Dragon*, or Shang Tsung's Crane stance, which is painfully familiar to that seen in *The Karate Kid*. Each

character has three combat styles: two involving martial arts and a weapon stance. Combos can be linked between styles, allowing for some nifty attacks. As always, a successful hit is rewarded with a flood of blood. Our conclusion: all the characters are hemophiliacs, with overworked bone marrow.

The character models, in motion, are borderline abstract. All males look like Steven Segal, and the females could easily be rejects from a Tomb Raider audition. The animations are slick though, and some will be hypnotised the overly buoyant breasts – explainable only by the presence of some gigantic planetary body or demonic possession.

And when the fight is over. . . you've *one* fatality. That's right, each character has just one fatality. And as far as fatalities go, they're not that imaginative or spectacular – the 'Wow' factor just isn't there.

In its favour, Deadly Alliance has furious and solid gameplay. The controls are easily handled, and the smooth character animations are enjoyable to play with and watch. However, the fact there's only two real game modes, uninspiring fatalities, and a linear story leaves you with the feeling that the new formula hasn't quite paid off.

8/10



GAME DETAILS

FOR: Solid and fluid gameplay; three combat stances for each character; awesome combos; combat with weapons; the many hundreds of goodies in The Krypt.

AGAINST: Linear story – no sense of achievement; cartoon graphics; boring fatalities; lack of game modes; and they killed Liu Kang!

DEVELOPER: Midway www.midway.com

PUBLISHER: Midway www.midway.com

DISTRIBUTOR: Acclaim Australia www.gamepower.com.au

PHONE: Acclaim Australia (03) 9674 5909

Devil May Cry 2

Whether or not it sheds a tear, John Gillooly's a little watery-eyed over this sequel.



ABOVE: Dante's acrobatic abilities have seen an upgrade. Seen here is his 'Enemies are GO!' attack.



ABOVE: Lucky for her, the game camera's been nice enough to let this little guy on-screen.



ABOVE: Graphics and effects are sweet, as are the character animations and flying zombie helicopters.

The hack-and-slash is a mighty fine genre with a long legacy behind it, and one of the standout titles of recent years was Capcom's *Devil May Cry*. Based originally on an overtly gothic move by the *Resident Evil* team, DMC was a revelation; and setting itself up as one of the more memorable titles of recent years.

Riding on this legacy, expectations for the sequel have been high, and on paper it appears that Capcom has delivered. Rather than be content with just playing Dante, the demonically-infused hero destined to hack and shoot demons until the end of time, you also get a chance to play a new heroine, Lucia, whose odyssey intersects Dante's and comes on a second disc.

There is also a new way of upgrading abilities through shards of an amulet that you pick up throughout the game. Each shard affects the powerup Demon mode, enhancing combat and giving new abilities such as flight.

Dante has changed little from the first installment; he's still the dark, brooding anti-hero who wields his sword and twin guns *Ebony* and *Ivory* in the pursuit of dead zombie types. If anything, he is less powerful, with fewer upgrades than the original. Lucia fits seamlessly into the role of female hack and slasher, being quick and vulnerable. She wields short swords or throwable daggers and while she does have extra weapons to upgrade to, like Dante, this part is short and ultimately unfulfilling.

Thrust into some sort of storyline involving

a demonic media baron and a search for artifacts, gameplay falls squarely into the 'move-forward-while-killing-things' category. While bonus points are given for doing it in style, they're hardly an essential part of the game. This is a major letdown because above all, *Devil May Cry 2* is definitely a game of style over substance.

One of the standout parts of the original was the fluidity with which Dante moved. He bounced off walls, smote enemies with deft sword strikes and casually gunned down those out of range of his steel.

The sequel is this on steroids. Dante can now leap even higher from walls, raining down a hail of lead on unsuspecting bad guys as he soars past. In an unashamed nod to a certain sci-fi flick he also runs effortlessly along walls and performs aerobatics that would make the most hardened gymnast wince with pain. Lucia's journey is remarkably similar to Dante's, with the missions intersecting on a regular basis, but with some extra underwater missions made especially for her.

The original game used a 3D engine with pre-rendered backdrops, like *Resident Evil*. These finely-detailed gothic environments suited the scene perfectly, and the sequel initially shows promise, with much larger environments to play in, and more freedom in the path you take. At least it gives this illusion as you bounce across the rooftops of the first town. Unfortunately the game is quite

linear and becomes less graphically impressive as the game moves along.

A big part of the disappointing experience is the game camera. It has been zoomed out a lot more than the original one, which initially allows for more enemies on screen at once but hits a major flaw, one that ultimately provides the biggest gameplay hurdle. The first encounter with a zombie helicopter still sticks vividly in the mind, as you deftly take down the undead flying machine without ever actually seeing more than a name and a health bar on-screen.

For a large chunk of the game, you're just going through the motions. The vast majority of enemies die a horrible death when off-screen, victim to a deadly combination of *Ebony*, *Ivory* and autoaim. This also adds to diminish the usefulness of style points, there isn't much point running up the wall, backflipping and stylishly smiting an enemy that you cannot actually see.

Devil May Cry 2 is a fun enough romp, but there is nothing that drags it above the rest of the games out there. The original proved that the concept can work beautifully, but unfortunately, this game is a fairly hollow gaming experience.

7/10



GAME DETAILS

FOR: Stylish; good-looking game; ability upgrades; two playable characters. Combat provides great short term fun.

AGAINST: Terrible game camera; confusing and irrelevant storyline; abilities not that great; a lesser game than its predecessor.

DEVELOPER: Capcom www.capcom.com

PUBLISHER: Capcom www.capcom.com

DISTRIBUTOR: THQ www.thq.com.au

PHONE: THQ (03) 9573 9207

Tom Clancy's RAINBOW SIX 3 RAVEN SHIELD

Win a trip to Hong Kong

Think you've what it takes to be a true to life Special Ops soldier?

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Fighting with your friends is fun:

The smart soldier will brush up on their close-quarter combat techniques in the online co-operative mode, with every mission from the campaign just begging to be completed by you and your buddies.

Let's dance:

Deathmatch is for the kiddies. How does a little bombing action sound, but with two bombs that can be detonated instead of a mere one? Or escorting a pilot to the rescue point while enemy Claymores, remote charges and a heavy lead shower wait to tear you back to reality? A total of five adversarial modes will remind you of just how good you need to be to survive online.

Guns, gadgets and geography:

Over 50 real world weapons should keep even the most demanding gun lover happy. Throw in some cool gadgets like heartbeat sensors that can see through walls, flashbangs and decoy sensors to distract your enemy, and you'll be coming up with new ways to hurt the bad guys for months to come. Jam all of this into some of the biggest maps ever seen in a first person shooter, and you'll soon realise that Raven Shield is a whole new battle zone, more realistic than anything you've seen before.

Watch my moves:

What other game allows you to open a door the crucial few inches needed to squeeze a Tear Gas grenade through? And when the bullets are flying thick and fast, diving to a prone position can mean the difference between life and Swiss cheese. Peeking around corners is also a recommended method for keeping your brain inside your skull. And if you like to bunny hop. . . well, you'd better look for a different game.



Be the best in Australia Take on the world:

Once you've honed your skills online, sign up to the upcoming GameArena Raven Shield tournament. If you think you're good enough. It's no ordinary tournament; the winning team will be flown to Hong Kong in May courtesy of Ubi Soft, to take on some of the most skilled Raven Shield warriors in the world. Convinced yet? Get online and head to raven-shield.games.telstra.com from the 1st of March; it doesn't

matter where you are – every state and territory in Australia is included, so you've got no excuse for not signing up. The tournament kicks off on the 9th of March, but your team can sign up any time, provided it's before the end of the tournament in April. Just remember, this isn't an arcade game to keep the kiddies busy. Only the serious soldier with the finest knowledge of weaponry and tactics need apply.

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CI/A27

Wise Sam, Samwise

Och, it be borken. No, no you read right. Borken. If you're computer's been playing tiddly-winks with your sanity, type some text explaining your dilemma and send it in to i/o right away – don't delay. No doubt Mr Rutter will be able to prescribe you something, and, if you happen to be clinically mental, you'll receive the wunderbar Logitech MX 500 mouse. Word.



i I00TM: Purposeless pin?

I suffered that horrible sinking feeling in the pit of my stomach the other day. You know the one you get when you break a pin on the IDE connection on a part that you can probably never buy again. Worse still, it was on a friend's computer! I managed to destroy pin 1 on a super-floppy drive. However, the next day, to my great relief, when I hooked it up anyway – it worked!

I vaguely remember from my college days that many of the pins don't actually do anything, but have no idea which ones are important. Can you please tell me the pin assignments for IDE?

Liz Braddon

Well, every pin does *something* (except for pin 20, which is used for keying; that one's only mechanically functional), but seven of 'em are earth pins.

You didn't cut one of those; you cut the Reset IDE pin, which is what's used to soft-reset the drive. Soft-resetting isn't often needed. By default, it happens when you reset the PC, and it can cure a drive that's been left in an insane state by a bad driver or some similar mishap, but a drive that *isn't* currently nuts will work fine if you reset the computer without resetting the drive as well. You can always reset your drives, whether or not they've got a pin 1, by turning the computer off and back on. You can find the standard IDE connector pinout here: www.bbdsoft.com/ide.html

i Send away

Status: U

X-UIDL: 341726538

I have been getting annoyed by the 'Send To' function when you right click on a file. When Send To is highlighted, my CD-ROM spins up, causing the computer to lag until it has read what is in the drive. I have deleted the programs in the Send To list, but cannot find the CD-ROM drive in the folder. How can I completely remove the Send To function?

Khemero Lee

Run Regedit (Start -> Run -> type 'regedit', without the quotes, and press enter) and navigate to HKEY_CLASSES_ROOT\AllFilesystemObjects\shell\ContextMenuHandlers\Send To. There should be one key in there, called (Default), of the type REG_SZ, and with a pile of hex as its value (7BA4C740-9E81-11CF-99D3-00AA004AE837). Double click it and delete the value data, and Send To should vanish. No rebooting needed. Save the chunk of hex in a text file, in case you ever want Send To back; you'll need to replace the original value to restore the function.

i Inadequate aperture?

I recently bought a GeForce4 Ti4200 card with 128MB DDR-RAM. My motherboard is an ASUS CUSL2-C with a Pentium III 933MHz that is not being overclocked (shameful I know). The problem I have found is that my motherboard only allows a max AGP aperture size of 64MB. Does this mean I am losing half the memory performance of my video card? How much of a performance increase would I see if I were able to increase the AGP aperture size?

Philip Choo

No, you're not losing any performance. A larger aperture size would give you a barely measurable speed increase, if it gave you any at all. The AGP aperture size sets the amount of system memory that can be shared with the graphics card, using the AGP bus to allow the card to behave as if it had more memory than it does, and store textures in main memory when it runs out of RAM of its own. Even if you're using AGP 8x, though, main memory via AGP will still be quite a lot slower than video card memory. If you actually *use* AGP texturing while you're playing a game, performance will drop substantially.

Some video card and motherboard combinations misbehave with default AGP aperture settings, causing 3D games to crash. In those cases, you need to set the aperture size to some particular size, usually 64 or 128MB. Setting the aperture size larger than that will give you a tiny performance gain, at best; with modern video cards that have tons of onboard memory, little of the assignable memory is ever likely to be used.

Setting an aperture size larger than the amount of system memory you have shouldn't ever help (you can't share memory that isn't there. . .), but it does apparently do something, for some systems. 'Something', though, doesn't mean 'anything you'll notice without running benchmark programs'.

Setting a *small* aperture size, by the way (32MB or 16MB), will disable AGP entirely, and leave your video card behaving like a 'AGP 0.5x' PCI card. Basically, if your system doesn't have any problems, don't worry about the AGP aperture size.

i Why so slow?

Why do ATA HDDs spindle speeds top out at 7,200rpm, while SCSI drives go to 15,000rpm? Surely the interface isn't a bottleneck, because today's ATA drives can't get anywhere near filling the bandwidth offered by ATA/100/133, and now SATA. Is it just that HDD manufacturers want to give their faster drives a SCSI interface so they can justify slugging people an extra \$350 for them?

David Allen

O There *is* an artificial market segmentation thing going on here. Faster rotating drives need better motors and bearings, but there's no reason at all why that level of engineering couldn't be applied to ATA drives. And, as you say, current ATA interfaces have bandwidth to spare.

The dead hand of marketing isn't the only thing to blame for the absence of high rotational speed ATA drives, though. Drives that spin much faster than 7,200rpm run hot enough that they're not happy in the average case.

Hard drives get hot because there's air inside them; air friction on the spinning platters makes heat. 10,000rpm-plus drives make *enough* heat that they need extra cooling. If you've got unusually good case ventilation and/or an unusually low ambient temperature, you can run top-spec SCSI drives without adding anything more to keep them cool. But if you drop those same drives into an ordinary mini-tower case, they're likely to die before their time.

Manufacturers therefore *want* to keep high-rpm drives out of the mainstream, because they would get showers of warranty returns if they didn't.

i Implausible error

Last week I bought Age of Mythology because it was recommended by some of my friends. It installed fine, but when it came to running it gives me this error: 'This graphics card is not supported by Age of Mythology. Please check <http://www.microsoft.com/games/ageofmythology> for a full list of supported cards. Age of Mythology will now exit. Video Card O: nv4_disp.dll NVIDIA GeForce2 MX/MX 400 Vendor {0x10DE} Device {0x110}.'

I have a 900MHz Duron on a Shuttle MK20N; with 256MB PC133 SDRAM; a 64MB GeForce2 MX400 PCI graphics card, and Hercules MUSE XL sound card. I have installed all the latest drivers for every piece of hardware I have, including the latest Detonator drivers, DirectX 9, VIA 4in1s, etc.

I tried the demo of AOM and it worked fine. I am able to run every other game I have. Is there a patch available to fix this problem? If so where do I get it from?

Robert Holcombe

O Your graphics card explicitly *is* supported by AOM (every NVIDIA chipset from the original TNT onwards should work), but there's a driver problem. If, as you say, you've already installed the latest drivers for everything in sight, and if none of those driver installs are screwed up (which they may well be, possibly to the point where nothing but a Windows reinstall will fix them; this is particularly likely if you're running Win98 or ME), then it could be a DirectX problem.

Changing your graphics driver to the default VGA one, then reinstalling DirectX, then reinstalling the graphics driver, may help.

i Precious metal

Status: U

X-UIDL: 341726630

I'd like to see some information regarding some snazzy Aluminium cases verses the old beige boxes. Maybe some temperature measurements with boxes of very similar dimensions, and even cover any air holes to ensure a fair trial (although they're part of the case, so maybe leaving them open would be an idea). You could use the same hardware inside (chip/heatsink/mobo) and measure the temperature inside, CPU temp, and even the surface temps of the metal.

Scott

O Computers in Aluminium cases generally run cooler than the same hardware would in a steel case, but that's not because of the Aluminium. It doesn't hurt that Aluminium conducts heat better than steel does, but it's the fact that aluminium cases commonly have more fans in them that makes the real difference.

Most of the world's PCs have only one through-flow ventilation fan in them – the single exhaust fan in the PSU. Many better machines have one intake fan as well, and maybe even another exhaust fan, but lots of cases that can accept multiple fans don't actually have them installed. Many Aluminium cases, on the other hand, come standard with extra fans. Most of the mid-tower Lian Li cases, for instance, come with one exhaust fan and two intake fans.

If you're interested in value for money, buy yourself a steel case with the features you want, including extra fan mount spots. You'll probably pay a couple of hundred bucks less than you would for the same thing in Aluminium.

i Nuclear computing

I was wondering, wouldn't it be great if we could use heavy water for cooling a PC down? Wouldn't that work? Isn't heavy water used in reactors? Why can't we apply the same method with the humble PC?

elmo198



ABOVE: If your computer looks like this, then heavy water may just be the coolant for you.

O Heavy water in a PC liquid cooling system would work no better than regular water, but it would definitely be way, way more expensive.

Heavy water is, chemically, practically identical to ordinary water. It *is* heavier: if you make a heavy water ice cube it will sink in normal water.

But apart from that, and a slightly higher melting and boiling points, all heavy water does is block stray neutrons better than regular water. That's why it's used in some breeder reactors to make plutonium from uranium; fast neutrons are slowed down enough by bouncing off heavy water nuclei that uranium nuclei can then capture them.

Neutron slowing isn't a high priority for PC water cooling systems, and heavy water costs thousands of dollars per litre. Furthermore, if you try to buy some, people are apt to think that you're considering turning a city into a smoking grease spot. All this makes heavy water less than totally interesting as a PC coolant.

i X-compatibility

I am planning on buying an Asus A7N8X Deluxe mainboard and an AGP-V8640 Ultra Deluxe video card, but I have read in places that AGP 4x cards are not compatible with AGP 8x mainboards. Is this correct?

If I buy this combination of mainboard and video card will I end up with a very expensive paperweight?

Chris Rutch



While it's hardly unknown for some motherboards to dislike some video cards, there's no compatibility barrier between 8x and 4x. Stick a card that can only manage 4x in an 8x slot and the motherboard should just run it at 4x, the same as happens with 2x cards in 4x motherboards.



F-f-f-flicker

After reading Dan Rutter's 'LCDs, CRTs and geese' article in *Atomic 24* I realized that I get eyestrain every time I sit at my computer because I cannot raise my screen's refresh rate above 60Hz, while WinXP recognizes my CRT as a 'Default Monitor'. How can I rectify this?

I bought my 17in Osborne MO117 from a friend without any device driver, and I've been subsequently unable to find any manufacturers drivers on the net.

On two occasions I've tried raising the refresh rate, firstly under Advanced Display Properties (to 75Hz) and secondly with RefreshForce v1.10 (to 85Hz), but the screen just blinks its power light after rebooting, forcing me on both occasions to restore my previous settings.

I also tried uninstalling the monitor within Device Manager with the objective of choosing Windows' Plug and Play driver, only for XP to automatically install it as a 'Default Monitor'.

I know my monitor supports higher refresh rates. What can I do to raise the refresh rate within Windows and during gaming to save my eyes from constantly becoming irritated?

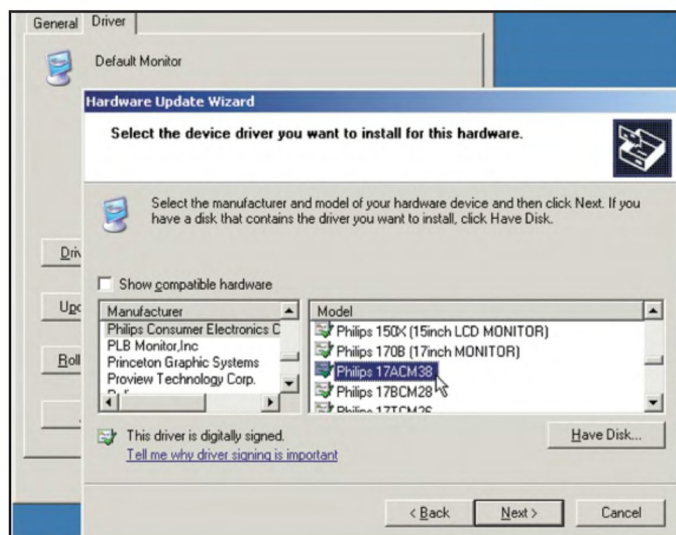
Noah Russo-Verderio



The MO117 is a rebadged Philips Brilliance 17a – all of the Osborne monitors were rebadged Philips screens.

If you want better than 60Hz, you're going to have to set the monitor to 1,024 by 768; it can do that at 75Hz, but can only manage 60Hz for higher resolutions.

75Hz isn't a very exciting refresh rate, but it's not too awful



ABOVE: When you can read what's written on the monitor, but Windows can't. . .

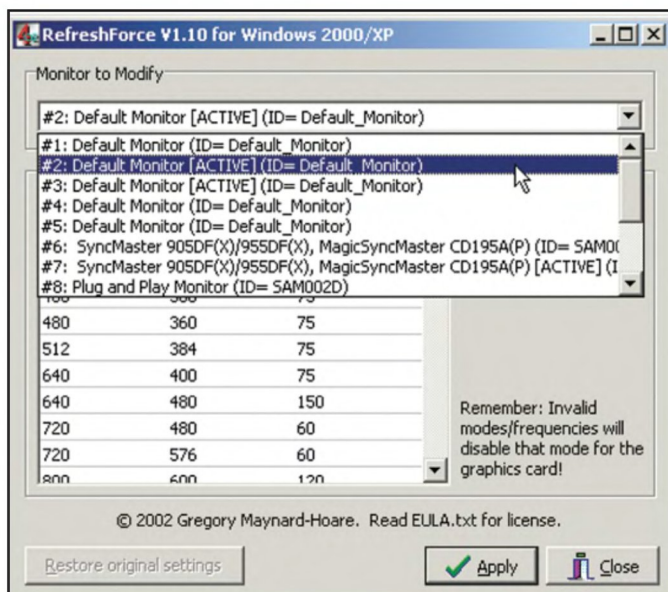
for general purposes, and 1,024 by 768 is all you can fit clearly on a 17inch tube anyway.

You can attack this problem from two directions. Here's the high-effort, low-return one.

Go to Control Panel -> System -> Hardware tab -> Device Manager, expand the Monitors entry, and double-click the monitor you want to change.

Then you go to the Driver tab, select Update driver. . . , Install from a list. . . , Don't search. . . , uncheck Show Compatible Hardware, and select the Philips 17ACM38 driver, which should be an OK match for your screen.

You can pick any driver you like, though; just as long as you don't end up asking the monitor to do something it can't do, you'll be fine.



ABOVE: RefreshForce can deal with systems that think they've got a *lot* more monitors than they really have.

If Windows insists on discovering three monitors every time you restart – to think we thought it would stop doing that when it stopped using Win95 code – then you can make the same change for all of the buggers.

You only actually *need* to change the one monitor that Windows thinks it's using, though.

RefreshForce (www.pagehosting.co.uk/rf) should be able to solve your problem; it's the easier method.

It lets you just plain tell Windows what refresh rates you want for each resolution and – wait for it – even works in 3D mode.

You can do all the fiddling you like in the regular display settings, but Win2000 and WinXP will still want to run at 60Hz in 3D mode.

RefreshForce is the best way of fixing that, so far.

If RefreshForce doesn't work, it could be because you're changing refresh rates for one of the pseudo-monitors that Windows has mistakenly detected, rather than the one it's actually using. RefreshForce should indicate which one's 'Active' in its list of monitors; if in doubt, do 'em all.

And then, there's multi-monitor setup.

[Holds flashlight under face, adopts spooky tone]

Imagine TWO monitors, each with their own zombie clones in the device list that use the wrong drivers, getting re-detected every time you restart. . .



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Redisabling for beginners

We're flooded by tweaks every month. While gasping desperately for every last un-tuned breath, we're drenched with. . . well . . . registry hacks mostly. As great as these are, we are still in search of the really hardcore stuff. If you have some cutting-edge, überordne, secret tweak or mod that gives your system the ultimate performance boost, or makes your life in front of your computer just that much schweeter, then share it with us, dammit!

Lazy AVI

Ever spent hours downloading a movie file, only to have the connection lost as the last few bytes came down the wire? This can render some files inoperable, wasting all significant time and data download allowance.

I found that you can view incomplete or partially downloaded DivX (AVI) movies, by using a utility called DivFix.

Justin

These days, with an ever-increasing number of broadband users, more people are soaking up their bandwidth downloading larger and larger files. Many of these, as it happens, are AVI files compressed using the DivX codec.

Unfortunately regardless of your download source, whether it's IRC, P2P or Web-based, you can't always be sure that the file you are downloading, at least in terms of video files, is the actual file you're after. It is becoming increasingly common for people to download what they hoped was a trailer for *The Hulk*, for example, only to find they have an episode of *BangBus*, carving precious megabytes into your download limit.

Indeed, it would be more practical to download a small portion of the file and view it, to be sure it's what you're after.

As luck would have it there is a solution to this, and for your convenience we have made it available for download at the Atomic Website: <http://www.atomicmpc.com.au/downloads.asp>

DivFix allows you to strip or rebuild the important index data from the end of most AVI files. It also has some error detection capabilities, which are useful for correcting such problems as missing key frames or corrupt delta frames.

With this utility, you can have a look at partial/incomplete movies by using the 'Rebuild Index' function. If you want to resume the download, simply strip the index back out and rebuild it when the download is finished. We tested this utility on a few AVI files which for some unknown reason refused to play. It worked for three out of four files tried.

DivFix comes in both Windows and Linux flavours too. It does have a couple of known bugs, but no real show stoppers.

Although not a performance booster, as usually seen in Phr33x Tw33x, it certainly makes your downloading experiences less time wasting. Go freeware!

1337ness 6/10

MSN Remov0ring

MSN is crap, but Windows XP shoves it in my face every time I boot. I can get rid of it from the registry, but then my lame sister won't be able to use it when she jumps on the computer. I could tell her she'll never use MSN again, but she will just have a cry. So, I found I can turn it off in the Group Policy Editor. I don't have to see it, and my sister can still talk crap with her narky girlfriends.

LouPe

Many people are not particularly fond of MSN as a messaging client – and you're a perfect example. Nor are they really happy about it loading up each time you launch Windows. However, stopping it from appearing is not really a straightforward task. When you installed XP Professional, you didn't ask for it, and it doesn't appear in Add/Remove Programs. It isn't in your Startup menu, and there is no option within the program itself to stop it from running. You can manage this problem, however, through the use of Windows XP system profiles.

Go to Start → Run and type 'gpedit.msc' and then hit Enter. This launches the Microsoft Management Console extension called Group Policy. In the left pane you will see the local computer policy, with a familiar looking Windows Explorer-type menu. Changes made under 'Computer Configuration' will take place regardless of the user logged in. Changes under 'User Configuration' are specific to the particular user, and don't affect other user accounts.

To prevent MSN from launching each time Windows boots, double click on either Computer or User configuration, depending on your preference. Select Administrative Templates → Windows Components → Windows Messenger, and then in the right pane, right click on both 'Do not allow Windows Messenger to be run' and 'Do not automatically start Windows Messenger'. Finally, check 'Enable' and click 'OK'. Reboot and you shouldn't see MSN cramping your style.

Be aware however, that some Microsoft apps depend on the Windows Messenger API, such as Outlook 2002 and Outlook Express 6.0, and these applications may try and sign in to MSN when you launch them, preventing the program from starting properly. Make sure you go into the options for these applications and on the 'General' tab, clear the check box that says 'Enable Instant Messaging in Microsoft Outlook' and hopefully all will be right with the world.

1337ness 7/10

Phr33x' personal tip

When Windows XP boots, it 'prefetches' all the bits and pieces it thinks it will need for that session, including shell and boot code, driver stuff, registry settings as well as pages from applications that were run during the previous session. According to Microsoft 'This information is logged and stored on your hard drive taking up space and requiring a process to be kept running monitoring which applications are being run.' Apparently this has the benefit of speeding up the boot process and the launch of start-up programs.

However, the c:\windows\prefetch folder eventually becomes cluttered with obsolete files, and this has the capacity to impact on overall performance. From time to time, such as when you may perform your standard defrag and other maintenance type tasks, take a peek into the prefetch folder and delete its contents, then reboot.

You may even wish to disable the 'prefetch' process altogether by firing up regedit and navigate to

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Session Manager\Memory Management\PrefetchParameters, then setting the value for 'EnablePrefetcher' to 0, and reboot.

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The Aural Decipher part 2

REMEMBER THOSE DINKY ELECTRONIC KITS FROM RADIO SHACK/JAYCAR/DICK SMITH? COMPARED TO MARK WHITE'S AURAL DECIPHER MP3 BOX, THEY'RE TOYS. THIS MONTH MARK SHOWS YOU HOW TO BEGIN CONSTRUCTION OF THE ELECTRONICS TO TURN YOUR MP3 BOX INTO A FULLY-FLEDGED STANDALONE, CYPHONIC DEVICE. TRUST US, CYPHONIC HAS NOTHING TO DO WITH WALT DISNEY AND HIS CRYONIC ESCAPADES. WELL, AT LEAST WE HOPE IT DOESN'T. . .



And here's one we prepared earlier. Your MP3 box might look something like this when it's done. Then again, it could resemble a deformed Mac truck.

This second instalment of the tutorial will not be a complete step-by-step guide into all the processes involved in manufacturing and implementing the external electronics. Instead, it will guide you through the general steps, so that means no bludging. . . you'll have to use that brain of yours for researching, experimenting and reading.

Ah, but you all thrive on challenges; so fuel up with some Jolt, pull up a chair and shift that brain into gear. With this, I will also be offering my personal opinions and tips to smooth the rocky road ahead. Good luck!

The uC-Board

The key that makes this MP3 box different from the rest is the uC-Board. It is an external circuit board requiring manufacture and assembly for ELMP to function. It is what interfaces the buttons and infrared receiver to the PC.

At the heart of the uC-Board is a general purpose PIC16F84 – a simple microcontroller. For the MP3 box, the microcontroller will be loaded with firmware which allows it to send a serial stream of data to the PC via the serial port, describing which button was pressed or the type of IR signal that was received.

There are a few electronic components surrounding the PIC chip: a crystal to maintain the clocking cycle, a few capacitors/resistors and a transistor to control the backlight. It's quite a simple circuit and shouldn't be too demanding. The hardest part will be making the Printed Circuit Board (PCB). . . more on that later.

Electronic virgin?

If you have never dabbled with electronics before, then I suggest that you might experiment with Dick Smith or Jaycar kits, so you will be

more confident in soldering, interpreting schematics and circuit assembly. Or you could dive in the deep end, and attempt the project from the word go – it's up to you.

While you're at it, next time you're near a Dick Smith store, pick up a catalogue: it contains a wealth of useful information in the back about resistor colour coding, Ohm's Law, and all sorts of other electronic info that will help in the completion of this project.

The start – the PCB design

I have designed three PCB patterns that will hopefully speed up the process of getting the MP3 box up and running for those who don't fancy creating a PCB pattern themselves. None of them are the same as the ones used for the Aural Decipher – which was custom designed for my case – but they serve the same purpose.

The three separate PCBs are the main uC-Board (with the LCD connections on it), and two keypads (you will find all the overlays, PCB patterns and more info in a PDF document at www.atomicmpc.com.au).

My uC-Board pattern will only support up to a 32 x 4 LCD (this includes a 40 x 2 LCD). If you want to use a 40 x 4 then a modification to the uC-Board is needed (the LCD requires an extra pin because it has two controller chips instead of one – refer to the schematics).

Now if you feel confident in designing your own PCB (from the schematics in the [elmp.zip](#) file), by all means go for it. In the PDF document on the *Atomic* site I have also compiled a list of PCB CAD programs that I found on the net.

I will warn you though, PCB design is an annoying process if you want to do it quickly – take your time.

From magazine to Copper

There are many ways of manufacturing PCBs: some hobbyists say you should use the toner transfer method or use a plotter to mark out the design, but I have found the photographic method of PCB production is by far the simplest, quickest and most accurate.



The jig I use for cutting PCBs. Just slide the PCB under the box-Aluminium, tighten the nuts, and cut away



A simple yet functional drill press for a Dremel. Don't laugh



Three different-sized soldering tips. I'd recommend the fine-tipped one on the left

First off you will need to buy a blank presensitised PCB. There are two main types: negative and positive acting. I previously used the negative acting presensitised PCB, until I discovered a company called Computronics Components, which sells a reasonably priced Kinsten Positive Presensitised PCB. It's also easy to use and forgiving. I recommend you buy the blank presensitised PCB and developer. You will need to take the following steps when manufacturing the PCBs for the MP3 box (assuming you're using the Kinsten Positive Presensitised PCB):

1. Download one of the patterns from the *Atomic* Website and print it on a transparency sheet either using an inkjet or laser print. I personally use tracing paper that can be fed through any laser printer.
2. Find a dimly lit room with a sink, away from sun and fluorescent lighting, as the presensitised PCB is sensitive to UV light. The rest of the steps will take place in this room, so make sure you have everything you need with you.
3. Cut your PCB board to the desired size. The best equipment for cutting the PCB is a special guillotine, but not many people have access to one, so a hacksaw will do just fine.

You may need to build a jig (see photo) to cut the PCB accurately.

4. Once the PCB is cut, remove the white protective sheet from the PCB; you should see a greenish film – this is the photoresist.
5. Place the PCB pattern on the glass of the UV exposure unit, making sure that it is not inverted. The easiest way of doing this is to have the PCB overlay with you and see if it corresponds. Put the PCB board on top of the pattern with the photoresist facing downwards; place a weight on top of the PCB to sandwich it to the pattern as well as the glass.

6. Turn the ultraviolet exposure unit on. The exposure time will depend on what type of exposure unit you are using.

If it is a bought one, then it may only take a

minute, but if it is homemade, using normal fluorescent tubes, it will take ten times longer. You will have to experiment with the timing to get the best results.

7. Mix the right proportions of water and developer in a plastic container.

Make certain that it is all dissolved before placing the exposed PCB in the solution otherwise one area of the solution may be more concentrated and cause undesired problems. Gently rock the container from side to side until most of the photoresist is dissolved and the PCB pattern is left.

This should only take several minutes depending on water temperature.

8. Wash the PCB board and plastic container.

9. Mix the right proportions of Ammonium Persulphate with hot tap water (assuming that it is around 60°C to 70°C) in the plastic container.

Add the Ammonium Persulphate to the water and not the other way around! Fill the sink with hot water as well, and place the plastic container inside it.

This is to minimise heat loss to the air, because the water temperature needs to be maintained at around 60°C to 70°C until all the exposed Copper on the PCB board is etched away. This will take around eight to 20 minutes – depending on how much the solution has cooled.

10. Place the PCB board in the Ammonium Persulphate solution and gently rock the container from side to side like you did for the developing.

11. Again wash the PCB board and plastic container.

12. Using Wet-n-Dry sandpaper, remove the photoresist so you are left with Copper tracks. You can buy a chemical to remove the photoresist, but that will cost more money!

13. All that's left is to drill the holes where the components go in. It is fairly simple, but I will warn you that you need to be accurate so you don't lose a solder pad in the process.

It can be very frustrating when you've come this far and you rip off a solder pad.

You may need a few goes to perfect the process of PCB making, but don't give up. Once you've mastered it, you can make all your electronic projects easier.

Assembly of the uC-Board

Boys and girls, what fun we have for you now!

You've dabbled with acid and now you get to play with hot implements and molten solder. . . what fun! Yep, it's time to solder the components to your freshly-made PCB: fairly straightforward, as long as you pay attention to the orientation of the transistor, PIC chip and the various connectors and components.

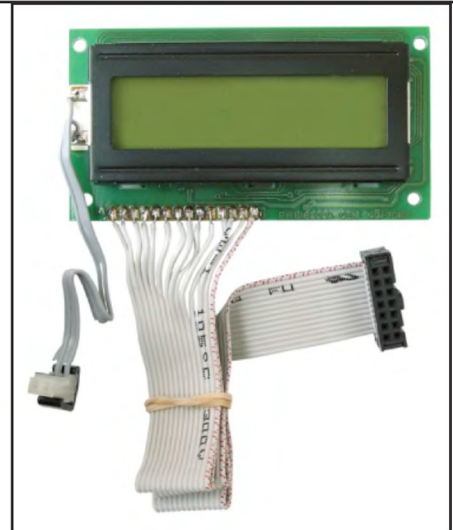
One area that I must stress is that you place your power connector around the right way. . . you don't want to fry any components. It's



The makeshift UV exposure box that I've been using to expose the Kinsten Positive Presensitised PCBs



An unused Philips TV remote. Well, it has a use now



A 16 x 2 LCD showing the 14-pin IDC connector and two-pin backlight connector

never pleasant realising you have just blown up a \$60 LCD display. I learnt this when I almost destroyed my \$250 VFD, but luckily I double-checked everything before powering the unit on.

To assemble the uC-Board, follow the placement of the components shown in photos. The value of R3 varies depending on the size and type of LED backlight used in your LCD display.

You will need to find out the supply voltage and the supply current for the backlight from the LCD datasheet, and then use the formula in the Dick Smith catalogue under the heading 'Using LEDs' to find out the resistor value.

Provided below is an example for a 40 x 2 green LED backlight display from Crystallfontz:

Formula: $R = (E - V_f) \times 1000/I$

$E = 5V$ (voltage from power supply)

$V_f = 4.2V$ (required backlight supply voltage)

$I = 280mA$ (required backlight supply current)

$R = (5 - 4.2) \times 1000/280$

$R = 0.8 \times 3.57$

$R = 2.80$

So a 3.30 resistor is required at R3 (you cannot buy a 2.80 resistor).

As long as the LED backlight is standard and runs on less than 5V, you can use my circuit to control when it is turned on or off – if not, you will need to find out your own way of interfacing the backlight to the parallel port.

If you are using a VFD, then you won't need the contrast components (ie. the 10k trim pot) or the backlight components as a VFD doesn't use them.

LCD, parallel and serial wiring

The wiring of the LCD, parallel and serial connections shouldn't be too demanding. All you have to do is watch out for where pin one is and the rest should follow though fine.

For the LCD, all the hard work has been done on the uC-Board: look at the schematics for a detailed description of the pin-outs for the LCD. Use a 14-pin IDC connector for the connection to the uC-Board and then solder the other end directly to the LCD. Make sure that pin one on the IDC connector goes to pin one on the LCD and so forth. Do this

and you won't have any problems. Double-check each pin, make a special note that on the LCD, VCC (5V rail) is on pin two and GND (ground) is on pin one and five.

The parallel and serial connections aren't as dangerous if you accidentally mess them up, but try not to, because it could cause damage to the PC. They are both a one-for-one connection.

So use the IDC ribbon cable and IDC connectors for both ends, line up pin one, and push the plastic securing device in using a vice and you're finished.

The combined length of the cable between the parallel port to the uC-Board, and the uC-Board to the LCD needs to be kept to a minimum. Some LCDs will not work properly and experience display artefacts if the cable is too long due to signal degradation. So if you are experiencing problems, try reducing the length of the cables. The VFD in the Aural Decipher is especially temperamental.

IR LED receiver and remote control

Unfortunately, the IR side of the project is a bit annoying to get fully working. The firmware in the PIC needs to be tweaked a bit. . . but it still works, just not as good as it could.

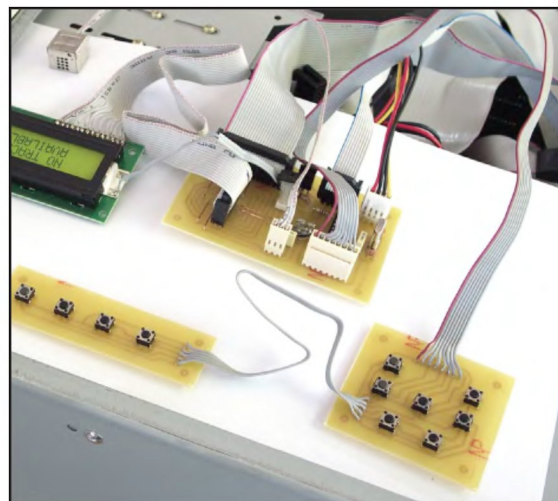
The IR LED receivers that you can buy from Dick Smith and Jaycar seem to have problems when working with ELMP. They experience noise and are unreliable. This doesn't mean that these IR receivers are bad – they just don't work with ELMP that well.

I have found some IR receivers out of VCRs and TVs work fine and a discontinued Tandy IR receiver worked exceptionally well. All of these have had a metal shielding around them – this could be the reason they worked better. You may need to experiment and see if you can find one that works best for you.

The remote controls that work with ELMP are old style Philips remotes that use the RC5 standard. ELMP doesn't seem to handle most



A straight one-for-one connection between a 26-pin IDC connector and a D25 male IDC connector for the parallel port – easy and straightforward



The uC-Board connected to the PC, all ready for the configuration of ELMP

modern RC5-compatible remotes for some reason. I use an old TV Philips remote, which was lying around the house, all purposeless.

If you are a keen Atomican, then maybe you could modify the PIC firmware (you may also have to modify ELMP as well) to have better support for remote controls. . . but it may not be worth the time and effort.

PIC programming

When you buy your PIC16F84 chip, it is blank, with no firmware, like a newly brought CD-R disk. To load the PIC chip with the ELMP firmware you need to use a PIC programmer.

You can either buy a ready-built PIC programmer or you can build one from a kit. Jaycar and Dick Smith sell PIC programmer kits. If you feel more confident, then you can go on the Net and source schematics for a PIC programmer and possibly save money, but that will require a lot of extra work.

Before you can even load the firmware onto the PIC chip, you will first have to compile the source code for the PIC16F84. My PCB pattern is designed for the firmware version 2.09. You will find the source (209.asm) in the elmp.zip file.

There are several programs that can be used to compile the source code, but I found MPLAB to be the easiest. You can find this nifty tool at Microchip's Website.

One site that I'd like to point you to is 'PIC Microcontrollers for beginners, too!' It gives a good overview of the PIC architecture and how to program it. It also contains instructions on using MPLAB compiler.

Once your PIC firmware is compiled, you can then use the software that comes with the PIC programmer to upload the firmware to the PIC chip. After this you can insert the PIC chip into the uC-Board and as long as everything has been manufactured and assembled correctly, the uC-Board should work. . . well not quite.

You will need to change a few settings in the ELMP configuration file, and then the uC-Board and LCD will be fully functional, and ready to receive input.

Configuring ELMP for the uC-Board and LCD

All that is left to do is configure ELMP by modifying the .elmp file on the LRP installation. I recommend you read both the Settings.txt and Configuration.txt files. Once you have finished the configuration you'll have completed the second phase of this tutorial. There are a few specific options that will need addressing:

1. First you'll need to configure the different 'mounts' at the start of the configuration file – it is fairly self-explanatory.
2. Scroll down until you see '[lcd]'. Under that you will find 'columns = 20' and 'rows = 4'. Change those two figures to the dimensions of your display (eg: for a 40 x 2 LCD, 'columns = 40' and 'rows = 2'). You may also need to change 'O x 378' after 'ioport =' to your parallel port address – most people won't have to.
3. Under the heading '[control]', change '/dev/ttyS1' after 'serial =' to whatever device your serial port is (the default is usually correct).
4. Last, but most importantly: the '[cmd]' options. This is where the custom functions for the buttons and remote control are set. Read Commands.txt for more information on each command.

When a button or remote control button is pressed, the debugging output on the computer monitor shows the button identifier. Use this to work out the identifier for each button so you can assign a command to it. Work that output!

Aural Decipher next month. . .

So now you've completed the uC-Board and your MP3 box is starting to shape... what's left to do? You'll obviously need to turn that beige box of yours into a sleek custom case. Next month I'll give you the low down on exactly how I constructed the Aural Decipher case, including attachment of the front panel, the button design and the general case construction. So grab a copy of *Atomic* next month and start building!

Extra information

The compiled PDF document that I discussed in this tutorial contains the overlays, PCB patterns, component/tool list, URLs to all Websites mentioned, a description of my home made exposure box, and other information that wasn't included in this tutorial.

You will need to download this from the *Atomic* Website at www.atomicmpc.com.au/misc.asp.

MACASE GLOWY DOOR MOD

MARIAH CAREY CAN GLIMMER UNTIL SHE DROPS. WE DON'T CARE. RON PROUSE SHOWS YOU HOW TO OUT-GLOW THE GLIMMERIEST, IF YOU'RE PREPARED TO GLOW, GLIMMER AND JUST GENERALLY ANNOY YOUR NEIGHBOURS. GO THE GLOWCOMOTIVE!

YOU WILL NEED:

- The case – if I don't state the blatantly obvious. . . \$139 at most computer shops;
- 24cm x 12cm x 4mm thick Perspex off-cut – clear or tinted – \$4;
- Stanley knife, jigsaw, hacksaw blade, hammer, tinsnips, various grades of sandpaper, five-minute epoxy glue, Silicon, two-pack body filler, masking tape, and vinyl spray paint;
- Four 3mm x 12mm nylon screws and washers – \$6 at Jaycar;
- Two 100mm cold-cathode bare tubes and inverters – Jaycar SL-286X tubes, \$11.95, Jaycar SL-2868 inverter \$9.95 (I love these things!);
- Hook-up wire, soldering equipment and assorted heat-shrink;
- A 'female' Molex plug – Jaycar PS-0740, \$2.25; and
- 24cm x 12cm Aluminium mesh – car accessory shops like Car Toys sell a sheet 120cm x 30cm for \$30 – split the cost with 10 friends!

The rebadging of products is increasingly common, and it doesn't get any more prolific than with this particular case design. If you haven't yet owned a variation of this box, chances are high that you eventually will. This is a really a great thing (for me at least) because it means that a 'case-specific' mod such as this will interest a reasonable number of people!

The obvious feature of the case is the door that conceals all of the drive bays, and it is this attribute that is going to receive some. . . ummm, attention :).

As with a lot of projects that look simple at the outset, this mod became a little harder as it evolved. My opinion is that you will need at least a medium level of handyman skills, some common workshop tools and, all up, about 10 hours of spare time. On a positive note, this mod does not require any PC downtime as the bezel and door are easily removed, so you can work on it in stages.

(See FIG 1)

SURGERY WITH A STANLEY KNIFE

The first step is to remove the door and get rid of the existing raised centre section by carefully cutting the 18 locating tabs with a Stanley knife – being careful not to end up as an honorary four-fingered Simpson – and cutting around the inner-edge of the bottom curve of the door with a hacksaw blade.

You will see there is a recessed 'lip' in the door frame on the sides and top (that the Perspex will be glued to), and that is the surface that needs to be perfectly flat, so trim and sand off the 'stumps' of the tabs.

The next step is to get a piece of paper, place it over the front of the door-frame, and trace out the shape of the opening, getting right into the inner edge of the recess. Using this as a template, transfer the shape onto the paper protective-sheet on the Perspex and cut it out using a jigsaw with a 24T pitch blade.

For the best results use the slowest setting that you can, taking some extra time getting the shape perfect – now will really show later! By the way, getting the bottom curve right is the really important bit of the exercise, as there isn't any room for repairing gaps on this part later.



The final result leaves plenty of room for personalisation – maybe a window etch?

Sand the edges of the Perspex until it is a snug fit into the opening, making sure not to round the profile over, as this is a critical part of the bonding area for the glue. Once the Perspex has been sanded to shape, trim off the protective paper covering around the inside edge where the glue will make contact.

Then rough up the exposed surface with 600-grit sandpaper, and do the same around the recess in the doorframe. At this point I suggest you protect as much of the doorframe as possible with masking tape to prevent any excess glue running all over it.

Mix up the five-minute epoxy glue, and brush a reasonable amount around the lip of the doorframe AND all the way around the edge of the Perspex. . . following this method will glue it in an L-section, and give the join maximum possible strength.

This is important, because the door is subject to flexing when it is opened, and a simple butt joint will crack after a short time in



With the Perspex fitted, it's time to attach the inverters and wiring with clear Silicon



Black plastic is non-reflective, so the mirrors help to spread the light more evenly

'The best type of mesh to use is expanded Aluminium, which is pliable and easy to trim to shape with a pair of side-cutters, one link at a time. . . yes, it's time consuming. . .'

use. And this we don't want.

To make sure the window sets flat and tight against the frame recess, lie the door face-up and put something heavy (like a brick) on top of the Perspex. Be careful not to glue the brick to the case – it's not part of the original design, you see. :P

You can now wander off and let the glue cure for several hours – preferably overnight.

This final stage is only required if your window has ended up with some ugly gaps around the edges of the joint. You can use a paintable filler such as Selley's No More Gaps or automotive 'plastic body filler' ('Bog') to hide those sins!

On this example, I decided to trim back 3mm of the paper cover all the way around the outer edge of the Perspex, and then run a thin layer of bog around the joint to give a smooth edge, like using quarter-round on a woodwork join.

With everything still masked-up, give the join a quick sand-over with 1,200-grit and then a coat of satin black vinyl paint. You should get a perfect finish!

(See FIG 2)

LIGHT WORK

With the window finished, it is time to get some lighting happening. I used 100mm bare Jaycar CCFLs on either side of the window, siliconed into place, with the addition of two small squares of mirror plastic to help maximise the reflected light. The wires on the lights were extended and then siliconed into place around the inside of the door so that they entered into the main bezel through a 10mm hole next to the bottom hinge.

Two 1/8in holes were drilled at the bottom of the door so that a cable-tie could be used to hold the wiring firmly in place

The main case bezel has plenty of air-space, and a recessed groove that runs down each side is perfect for the inverters to be placed in, held in place by two large blobs of silicon on the back of each PCB – this also keeps the high-voltage outputs away from unsuspecting and easily damaged fingers.

The 12V power-in wires were extended so that they reach into the case-space, and a female Molex plug was fitted to the end.

OPTIONAL STEP: WIRE MESH GRILL

Well, the window looked great, but there was one more addition that I thought would improve it: a wire mesh grill, moulded to the window shape. . . adding an industrial toughness to the effect.

The best type of mesh to use is expanded Aluminium, which is pliable and easy to trim to shape with a pair of side-cutters, one link at a time. . . yes, it's time consuming, but any other backyard method, like tin-snips, will buckle it badly.

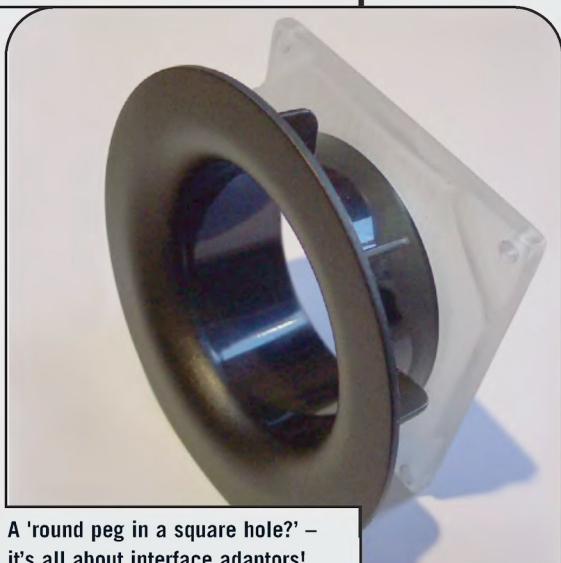
Copy the original window shape but allow an extra 3mm on all sides. Place a piece of wood underneath for support and use a small hammer to bend a 3mm 'lip' inwards at right angles all the way around the outside of the mesh so that it stands off the Perspex by that amount. Drill and tap four holes in each corner of the window for the mounting screws, paint the grill and screws to match the case, and assemble. Looks good or what?

TUBE OF DEATH

'DIE YOU MOFO, DIE, DIE, DIE!' THE WORDS WILL FLOW LIKE AIR OUT A FAN GRILL. RON PROUSE IS NOT QUITE AS COLOURFUL AS THIS MOD, BUT AT LEAST HE BLOWS. AIR.



An LED fan adds significant 'Wow!' factor to any casemod.



A 'round peg in a square hole?' – it's all about interface adaptors!

This mod is a new twist on an old theme. The Tube of Death (an interesting name considering what it does) was one of the first case-mods I ever saw, and the functionality of the concept is every bit as valid today as it was back then: cool air saving the arse of hot Silicon!

The original idea was to have a tube running from the outside of the case so that the airflow over the CPU heatsink fan was 'room ambient' air, rather than the warmer air from inside the case. You can't argue with the logic, especially when you consider the woeful ventilation that some older PC cases suffered from. As modders began to add more case fans, and ambient case temperatures

dropped, so the Tube of Death became less relevant – after all, if you have 400cfm (cubic feet per minute) of fresh air rushing through, then the air temperature will be nearly the same inside as outside. But the wind tunnel effect comes at a price: *noise and power consumption* – and if you have a plethora of fans then you will understand both of those drawbacks.

The desire for good ventilation at a reasonable noise level has created a resurgence of the humble ToD. After all, why cool the whole case when there are really only three main 'hotspots': the CPU, GPU and HDDs. The trick is to deliver cool air to where it is needed the most, and that will then reduce the overall temperatures by attrition.

The old ToD was always a passive solution: air was sucked through by the HS fan; but what if there was a fan attached to the tube to make it 'active'? The advantages are that the volume of air will be greater, air can be directed straight to the spot it's needed and, because the fan is inside the case, the noise level is much less than a conventional 'blowhole' inlet.

The question is: how do you fit a round peg (the tube) into a square hole (the fan)?

(See FIG 1)

The answer is an adaptor plate made from a 90mm x 90mm x 10mm thick piece of plastic, a 62mm ID subwoofer port from Jaycar (cat. # CX2690 RRP \$4.95), an 80mm fan and grill, and four 3 x 12mm screws/nuts. You will also need a jigsaw or similar, a drill and bits, a 1/2-round file, sandpaper and five-minute epoxy glue.

Fabricating the adaptor plate is fairly straight forward, but it needs to be accurate, as the tube has to be a tight fit inside the plate. The first thing to do is cut the tube to the length that you need, less 25mm for the fan when it is assembled, and taper the outside edge slightly. Then use the *inside* of the tube to draw a circle onto the centre of the plastic, and cut out the hole 1mm larger with a jigsaw or similar.

Using a half-round file and sandpaper, enlarge the hole evenly until the tube will slide in (filthy thoughts aside), while still a really tight fit. Keep the shape circular and the edges of the hole as square as possible. This is known as an 'interference fit', and there needs to be maximum possible surface contact.

With the hole finished it is time to attach the fan. Place it in the centre of the plastic, lining it up with the hole. Mark and drill 3mm holes in each corner for the screws, and thin the adaptor plate down to 4mm on the corners. Attach the fan and then file down the adaptor 'body' so it is the same size as the fan body.

For maximum wOoT effect, use a clear LED fan and sandwich a laser-cut grill between it and the adaptor. The grill will also stop the tube sliding in too far, hitting the fan-blades.

The port has eight flutes around the outside, with an outside lip 20mm wide, allowing plenty of room for gluing it in or for covering any slips made while cutting the case!

The concept is to cut out a 75mm hole, with a sunburst of eight 2mm-wide slots for the flutes to fit into, securing the port and stopping it from turning around.

Use epoxy glue, or Silicon, to attach the tube to the case to minimise vibration, then attach the adaptor and fan and power it up!

As you may have already realised, this is a great method for adding a blowhole anywhere on a case, especially the top, as there are no visible fan-screws and the ports look really pro-finish!



HAVE YOU DONE YOUR "CASE" STUDY?

www.lian-li.com

You may have the latest and fastest CPU and VGA card. Do you have the best case to house all the greatest components? Aluminium cases dissipate heat 3 times faster than traditional steel cases and when it's made by Lian Li, your PC experience is guaranteed luxurious. Here are some comments:

apc Australian Personal Computer

"Lian Li cases are legendary among PC enthusiasts and case-modders, and are generally considered to be the Rolls Royce of aftermarket PC cases. Not only because they are comparatively expensive, but because their features and attention to detail warrant the price."

PC PowerPlay

"A stunner. All aluminium and built to withstand a direct nuclear strike in the megaton range. As we have mentioned more than once, we even dropped this case down a flight of concrete steps and it barely flinched. Ten bays keep everything snug, three extra fans keep it cool, and slide-off covers and a motherboard tray mean it's ready for upgrade action any time."

atomic MAXIMUM POWER COMPUTING

"Undoubtedly the parent of the Aluminium case craze, Lian Li has been incredibly successful in changing the case buying mindset."

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PC-6089A

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PC-39A

Silver hard anodized aluminium mini case with built-in 2 mobile racks. 8 total device bays 2x5.25", 1x3.5", 3x3.5" hidden for HDD. 2 x ATA133 lockable mobile racks. 2 x 8cm sleeve bearing case fans. 2 x front USB ports
\$425.00 RRP



PC-60USB (Silver)
\$299.00 RRP

PC-65USB (Silver transparent panel)
\$369.00 RRP

Common features

- ◆ Hard anodized aluminium midi case.
- ◆ Removeable mainboard tray.
- ◆ 12 total device bays, 4 x 5.25", 3 x 3.5", 5x3.5" hidden for HDD.
- ◆ 4x8cm sleeve bearing case fans.
- ◆ 2 x front USB ports



PC-61USB (Black)
\$340.00 RRP



PC-7 (Black)

Full aluminium anodised black midi case
\$260.00 RRP

Common features

- ◆ 12 total device bays, 4 x 5.25", 2 x 3.5", 5x3.5" hidden for HDD.
- ◆ 3 x 8cm sleeve bearing case fans.
- ◆ 2 x front USB ports



PC-5 (Beige)

Economy beige aluminium midi case with plastic front
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PC-70USB (Silver)
\$499.00 RRP

- ### Common features
- ◆ Hard anodized aluminium full tower case
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 - ◆ 4 x front port USB extender panel



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PC-T3B



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Panel-65
Left side window panel for PC-60USB Case
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Panel-75
Left side window panel for PC-70USB Case
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Panel-75B

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Best Sex on the Desktop comp

Ready to win? In *issue 25* we asked Atomicans to send in their best looking, hottest Desktops. And the prize for your hard work? The Compro VideoMate Cinema! Included in the kit is a GeForce4 Ti4200, an external TV tuner and a remote control, all thanks to George at AMI (www.amicomputers.com.au). Cheers!



A Desktop – make it beautiful, and sweet and succulent. That was the task set. We weren't afraid of being swamped with variations of the 'Blue sky/Green meadow' theme, because we have seen the pure ingenuity and amazing creative talents of Atomicans in Hot Box every month. And as sure as sure is sure, we've been given some greatly (and mighty attractive) Desktops. Be it sleek and efficient, or just a smokingly tops backdrop, we picked the finest of what we received. It was a tricky choice, so we've included a whole bunch of the magically magnificent Desktops that were sent in. Jaws. . . drop

Winner – Sunfire

It's Nick Lam – we couldn't go past his Active Desktop effort. Using VBScript, Nick's literally made his own Desktop, with almost nothing but what came with XP. The flaming red and space/futuristic look is in. Along with VBS, Nick's made use of a Mac OS X dock clone called Y'z Dock, as well as Coolmon, and a variety of scripts and plugins that work with it. Congrats Nick, you've won the Compro VideoMate Cinema.



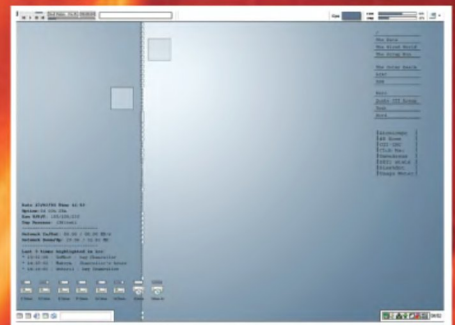
Blue Ice

Nice, blue and cool. Rightly a keeper from David Elliott, who mastered this artful piece of art in Photoshop. With the help of SharpE, he turned it all into a neat-o Desktop. Top stuff David – very likeable.



Rendition Lite

A nifty Desktop from Luke Busellato, who sent us a number of entries. This one uses Litestep, and shows looks can be accompanied by functionality. Having V.Too in the browser window – you had to remind us?



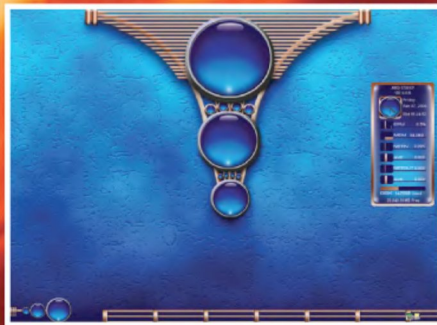
Faded Morning

Jeff Nohl (Chancellor) has captured the calm morning on his Desktop. How long he'll keep it chained and screaming in his basement, we don't know, but a nice combination of SharpE, ShellIWM and Coolmon.



Beautiful World

It's a 'Beautiful World' – for Alex Moon at least. This Desktop appealed immensely to the Atomic staff, and the Chinese writing is a lovely touch. Warm the cockles it does. A great Litestep Desktop.



Gem Metal

Steve Jamieson sent this blue beauty in. The gem and metal background was all Steve and Photoshop, and with a little help from Desktop X, he constructed this awesome piece of work.



Iris

'elmo198', or William, emailed us the 'Iris'. Apparently he likes the Linux look. Really not in a position to blame him, as we like it too! This Desktop was crafted with the assistance of WindowsBlinds.



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Asus AV78X – Motherboard
Corsair XMS 3500 DDR CAS-2
Hercules 9700 Pro 128Meg 8X AGP
Digital 5.1 - S/PDIF in/out Interface

2 X Western Digital 100 Gig JB HDD's
(200 Gig Striped Serial ATA Interface)
Samsung 1.44 Meg Floppy Drive
Sony 16X DVD Rom Drive
Ricoh MP 5125A DVD+R/+RW

Hitachi 17" CM 621 Flat CRT Screen
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W I N N Y

Monsoon speakers

Famous speakery things from history include the klaxons from the George Pal version of *The Time Machine*, Nigel Tufnel's Marshall stack, the mega-megaphone on top of the cop special used to announce 'ladies night', and the huge cone from *Back to the Future* that blows Michael J Fox through a wall, which is no easy feat.

Speaking of Michael J Fox, the Monsoon speakers are short yet effective, which is something you may find useful. We emailed QTD (03 9876 9910) with the Nigerian money scam email, but replaced the word 'Nigeria' with 'Atomic', and 'my son Museekybuto' with 'Monsoon Speakers'. QTD replied quickly and as a result we have these speakers to give away. Yay.

Q: What is the nominal threshold of pain (in decibels) for the human ear?



Hercules DV Action Pro

There's a little bit of home video enthusiast in all of us. Now that Win XP has Movie Maker, you can make basic crap. Which is pretty basic. And crap. But! If you enter and win this comp you'll score the Hercules DV Action Pro, which turns all those other playground antics on their head, upside down. All the way from video importing to burning the final DVD, this swanky kit does it all in a pro-like fashion.

You get a card and a neat plastic USB shuttle controller and some software, too. Turn your home PC into a movie studio to rival the greats! Suck on that Steven Segal. And Steve Jobs.

Thanks Hercules!

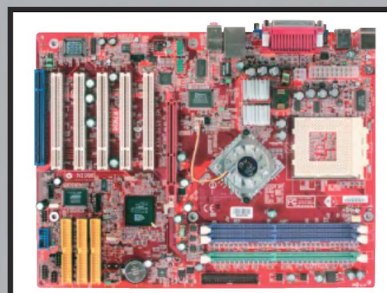
Q: Who were the parents of the three Harpies: Aello, Celaeno and Ocypete?



MSI K7NG2

In this very issue of *Atomic: The Magazine*, Big John Gillooly rounded up 1.2 shitloads of Athlon (and Duron, if you're that way inclined) motherboards. Some rocked particularly hard, like the MSI K7NG2, a wonderfully fully featured and sooper high-quality mobo, which you may well desire with great intensity. Thanks to MSI (www.msicomputer.com), we can give you one. How tops is that! Win this and you'll sport Integrated GeForce4 MX graphics, SATA, Dolby 5.1 sound and dual-channel DDR – all humping along the nForce2 superhighway. Of greater importance, though, than a bunch of techoid specs is the fruity magenta colour. By the power of pink grapefruit - it compells you to Perspex your box.

Q: What is a Braxton-Hicks contraction?



EMAIL ENTRIES TO WIN@ATOMICMPC.COM.AU OR POST THEM TO: *ATOMIC*, PO BOX 275, BEACONSFIELD NSW 2014. PLEASE SEND A SEPARATE ENTRY FOR EACH COMPETITION. PLEASE ENSURE THE COMPETITION NAME IS THE SUBJECT OF THE EMAIL, OR IS DISPLAYED CLEARLY ON THE FRONT OF THE ENVELOPE. THE CLOSING DATE FOR ENTRIES IS 16 APRIL 2003. WINNERS WILL BE ANNOUNCED IN *ATOMIC 29*

Atomic 25 winners: Mechwarrior Mercenaries: Q. What were the last spoken words in *2001: A Space Odyssey*? A. 'My God, it's full of stars.' C. Winning, Rockingham WA; D. Jaillet, email; K. Viola, Clayfield QLD; A. Donohue, Carseldine QLD; S. Ling, Flagstaff Hill SA; M. Shedden, Beechboro WA; K. Williams, Pascoe Vale Sth VIC; M. Burpee, Trott Park SA; J. Woolley, Merrylands NSW; P. Harry, email. Albatron GeForce4 MX 440 AGP 8x: Q. What letter did the trees form in *It's a mad, mad, mad, mad world?* A. 'W'. T. McGruther, New Farm QLD. Anyware Perspex case: Q. Whose wings were like shields of steel? A. Batfink. J. Edwards, Nth Ryde NSW. Juzt-Reboot WOL-NT: Q. What were the Bionic Woman's strong bits? A. Two legs, one eye and one ear. C. Blackburn, Kuraby QLD.

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LETTER IN



The *Atomic* Letters page is just like the *Atomic* forums – except that what's written here will be read by millions of people and will last for thousands of years. Get yours in. The shiniest examples of the magazine letter writer's art will win a Logitech MX500 mouse, which is extremely shiny.

Flick her

I wanted to address Dan Rutter regarding the LCD screens piece he did in *Atomic 26*. He indeed knows his stuff, but IMHO he is wrong on this issue. As LCD screens are constantly on (the electricity flowing in is DC too, which means that unlike your average lightbulb, always-on means always-on), they have no flicker whatsoever. My monitor runs at 85Hz and I certainly don't notice any flicker, but my friends LCD screen. . . wow. Other than the constant light is the fact that it is passive, and not active. For those that don't know what this means, here's a quick explanation: active light from your CRT monitor is beamed directly out, onto your eyes, whereas the passive LCD screen just glows. It just feels better to look at overall, and definitely does less damage to your eyes. Perhaps it's all in my mind, but I prefer LCD screens over CRT, even if the response time is slightly high.

FRiO

Dan Rutter replies:

The electricity flowing into an LCD screen from its outboard power supply may be DC, but the fluorescent backlight runs from high frequency AC. LCD screens are, as you say, definitively flicker free, but I'm not sure where you think I said otherwise.

*I'm also not sure where you got your passive/active definition. If anything, CRTs, even ones with fancy non-reflective coatings and thick front glass, emit **more** uniform*

LOTM: Hoons for a New Age

It was about 7.30 last Sunday night, and the VB was sliding down just as easily as the sun. The foliage outside the window was filtering whispered darts of sprinkled light into the room, and I was feeling reflective. Leaning back on the IKEA 'Glock Ergonomik' chair, I sharpened the Steadler HB in preparation for the application of a layer of graphite to the bridges of a Duron, to unlock the pathways to multiplier heaven.

A games machine for a good mate was the project.

Scattered before me were the remnants of a heatsink off an old BX motherboard, crudely hack-sawed and lovingly filed into shape, all destined for fixing to the memory chips on my old battle-scarred buddy, a trusty spare GeForce2 Ultra, in the vague hope that a drop of a couple of degrees Celsius would translate to a fraction of memory speed. Some old case fans dusted with an old toothbrush were reserved for this purpose. The CPU heatsink fan had been given the same treatment, and the blades polished till they reflected the grimy, filtered light. (Because we all know from our childhood Biggles that a polished propeller will spin about 2rpm faster!)

I sensed I was moving with languid, but precise and almost automatic movements. All my efforts were directed at one goal. Frame rates. As the light dimmed and I peered closer at my creation, almost imperceptibly I sensed something tugging at the shirt sleeve of my psyche. It grew stronger, and after a while it began to trouble me – what is that smell? I can smell petrol. . . or something. But the bloke next door isn't mowing. . .

I stared out the window and slowly, as the glowering dusk made my sight blur and the rhythmic drone of a late summer cicada numbed my senses, I was transported back in time. Back through a tunnel of memories with blurred and blunted edges; to the same time of day at the same time of year, but 20 years ago. The same light, the same cicada drone, but my sister was there in a Choose Life T-shirt and fluorescent socks.

It was 1983.

And there were my brothers, hunched over the engine bay of a Holden ute, purpose-built from the ground to cross a quarter mile of hot-mix in under ten seconds. And through the dim light I saw a young bloke, barely a teenager, crouched on the oil-stained concrete, poring over what seemed to be a massive, dismantled carburettor. He held a brass fuel delivery tube which he'd painstakingly polished so the inside glistened and the outside could hold a reflection.

I realise that he, was me. And it was me who'd polished that tube because everyone knows that when a supercharger is switched on, the carby better be ready to allow the high flow of fuel, because that's how you'll get a few extra revs out of that massive Chevy motor. . .

And then it hit me. A revelation. I was on the road with Damascus and this was my epiphany:

A barely pubescent boy fine-tuning a carby; a middle-aged guy poring over a CPU with a pencil; an old bloke in his shed whacking few drops of metho on the tank of the two-stroke whipper-snipper to make it really scream – we're all the same, motivated by the same impulses. We subscribe to the Hoon's Creed: 'It Must Go Faster'. And if it can't go faster, we'll break it trying (we blew the Chevy motor at the next drag). We're all the Hoons of our generation.

I'm telling you this because it gives me comfort. I like to know that the excitable kid covered in petrol became an excitable guy covered in Arctic Silver. It makes me happy to know that the more things change the more they stay the same. It makes me anticipate with delicious delight the crazy schemes I'll come up with to have the fastest goddamn whipper-snipper in the retiree's housing estate.

Anyway, I've got to go. I can hear mum. . . sorry, the wife, calling me for dinner.

Krunsty

POTM: The Unofficial Atomic Beginner's Overclocking Guide

By DonutKing

www.atomicmpc.com.au/forums.asp?s=2&c=6&t=510

The appearance of this thread caused a ripple in the force that is *Atomic*. If anything is perfectly and definably '*Atomic*', it is overclocking. Many posts and guides for overclocking have been made over the life of our forums — including spamzor's excellent guide, and NutterPC's ongoing guides.

DonutKing picks up the POTM because his overclocking guide is a clear and concise guide to every little corner of overclocking. Well, it's 'concise' at a neat 16 pages, and almost 10,000 words. We could never fit something of that epic length in the magazine, but, thanks to DonutKing, a magazine-quality guide is now online forever for all to use. Crediting his helpers - anzs_kickass and abzOract, DonutKing shows too that the Atomic spirit of mutual back-patting runs strong in our community.

Bloody good job Donut, we're all most exceptionally impressed.

light than polariser-fronted LCDs. Neither screen 'beams' light outwards. Yes, the apparently-CRT monitors on the ore hauler *Nostromo*, which have also been seen in various other movies, project images on people's faces. But real CRTs don't.

Embedding the bird

While flicking through your magazine and fantasising about the latest mods. I can add that I am a 'mod-aholic' ('Hi, my name's Tom and I have a mod problem,' 'Hi Tom!')

Anyway, I came across a comment that totally threw me. In *issue 26, page 84* (the Aural Decipher), you talk about the Linux Router Project. Below the image is the comment: 'The initial loading screen for the Linux Router Project – complete with the bold statement, 'Embedding the bird for the sake of all humanity'.

Ok, now I'm guessing that 70% of the peoples know what that means, but unfortunately I fall into the 30% who don't. Can you explain what this means? Why's that its slogan and what does it mean?

Tom McGruther

Mark White replies:

Well. . . an embedded system is a device that is dedicated to a specific task, such as the Aural Decipher (dedicated to playing MP3 files). Now the Linux Router Project has been designed so that it can be run as the basis of a dedicated system – primarily for a network solution such as a router/firewall.

Now I'm assuming that its using the word 'bird' to refer to the Linux penguin, meaning that it is 'embedding Linux'. I can only assume that the part about ' . . . for the sake of all humanity' is the praising of the Linux OS (being open source, stable, fast etc.) – maybe going as far as to say that there are some poor embedded systems out there, and doing so will save our civilisation from their problems.

Lite Windows

With regards to the reply to the 'Lite Windows' letter, or email as it were, you claim (as well as Microsoft) that:

Microsoft has met the requirement of placing an uninstall feature into the latest Windows version with their respective service packs, but this really is not the issue. All they have done is added an 'add/remove' option for some middleware products. In actual fact some of these programs are so integrated into Windows their program files can not be removed at all. So I ask you has Microsoft really satisfied this requirement at all or just misled the DOJ?

Michael

According to the conditions of the judgment, yes it met the requirements. But were the nine states involved in the case (or other concerned parties) satisfied? Of course not, they lost. They were happy, however, to reach a compromise. We can't always get what we want.

There are loads of Windows components that cause users grief. For some, its Windows Messenger; for others, it's the OS libraries that handle memory operations (up until Win2K, they were abysmal). Microsoft hasn't 'mislead' anyone (in this regard, at least). Try to look at Windows and, say, Messenger, as one entity, rather than dividing them into the OS and middleware. They are offered as a single package, and ultimately, that's the fact you accept when you buy the software.

As for integrated applications: Let's use Internet Explorer (or Windows Explorer; the executable filenames are hard to differentiate. . .) as an example.

If you decide to develop a type of application (such as a browser) for an operating system that already has one in-built, you face the fact it may never see the light of day. There's nothing wrong with packaging a useful, complementary and needed application – if an OS lets you connect to the Internet, it should come with a browser. It's true you can't remove it, but it's easy enough to run Netscape or Mozilla.

People tend to use what's at hand if it meets their needs; if it doesn't, that's when they go looking for something more. The adventurous among us are the ones who tend to be the most frustrated and annoyed at the limited choice. But you use an OS, and you live with its advantages and disadvantages. Don't like un-removable middleware? Then don't use Windows. Hate command prompts and kernel compiling? Avoid Linux. You always have a choice.

Plug-in love

I got my first PC when I was 25, it was a 386DX/25 and I bought it because my mate had an Amiga 500 and I liked to play F/A-18 Hornet on it. In a games shop one day (anyone remember Game's Spot?)

I saw a title called Falcon 3.0 running. That afternoon I bought my first PC. I got into it like nothing else. I think that week was the last week I ever went to a nightclub. Soon I discovered that in 'High Fidelity mode' Falcon 3.0 would run with an even more realistic flight model – but you needed a maths coprocessor. So, I went and spent, from memory, \$250 and plugged the little chip into my motherboard. I felt like an undergraduate from Los Alamos! Not only was I a near-qualified fighter pilot – I'd also re-engineered a computer! While my knowledge and grip on reality has since improved, that magic feeling has never left.

Viva *Atomic*!

FoxHunter



Big Boss blues

As I write this, the 'Slammer' worm is wreaking havoc across many of our Asian neighbours and shutting down more American ATMs than an EM pulse. This worm seems to have a penchant for Microsoft code, which has made it particularly nasty for a large percentage of the world's servers – and in turn the Internet. Blame is flying thick and fast: Microsoft is saying that network administrators are at fault for failing to install patches; admins are saying Microsoft's SQL Server keeps springing security holes faster than the Titanic in an ice floe.

Frankly, I really don't care who's at fault. I just want my access back.

I first noticed the problem watching *The Hulk* Superbowl trailer. The preview streamed like some big blob of green jelly; the big guy looking like he was doing Tai-chi on ice. Eric Bana's new stint as a raging killing machine (typecast? Maybe. . .) made me wish I'd switched off the fridge and packed a sandwich. Sooooo sloooow. . . same thing with the new *Daredevil* trailer – still frames about as exciting as George Bush in tights. They say our generation is the least patient ever – and it's no wonder, when our entertainment stutters like Elmer Fudd reading Latin.

Slow access aside, there's a few other things that bug me about these virus attacks. First, the way the media refers to the nasty little programs. 'Worm' just doesn't seem to cut it anymore. Symantec tells us that a worm is: 'A program that makes copies of itself – for

example, from one disk drive to another, or by copying itself using email or another transport mechanism'. A better definition is more like: 'A huge pain in the arse that blocks all access' – which brings a bunch of descriptives to mind ('suppository', 'wedgie' or 'George Michael' all being good ones).

Then there's the way they propagate. For the past few months I've been getting executable files from someone called 'Big Boss', promising something really exciting. Well, I may have trouble opening a child-proof cap, but I'm not totally stupid. 'Big Boss' doesn't sound even remotely friendly – the only Big Boss I know is Ben (and I never open anything from him). They may as well send 'This file contains a virus, so open it now you idiot'. Wouldn't it make more sense to say something like 'Your mother's Christmas wish list' or 'A photo of you in a service station toilet' (I'd be sure to open that one). Some hackers just aren't very smart. . .

Mind you, I received an interesting message recently from someone called 'SysAdmin', asking me to install a security patch. I did have to think twice before deleting that one. I'm still not sure it wasn't legitimate, but figured the bright pink background was a reasonable giveaway.

Which makes me wonder: how long before someone manages to redirect downloads from legitimate sources, like Windows Update? Imagine being told you have five new patches

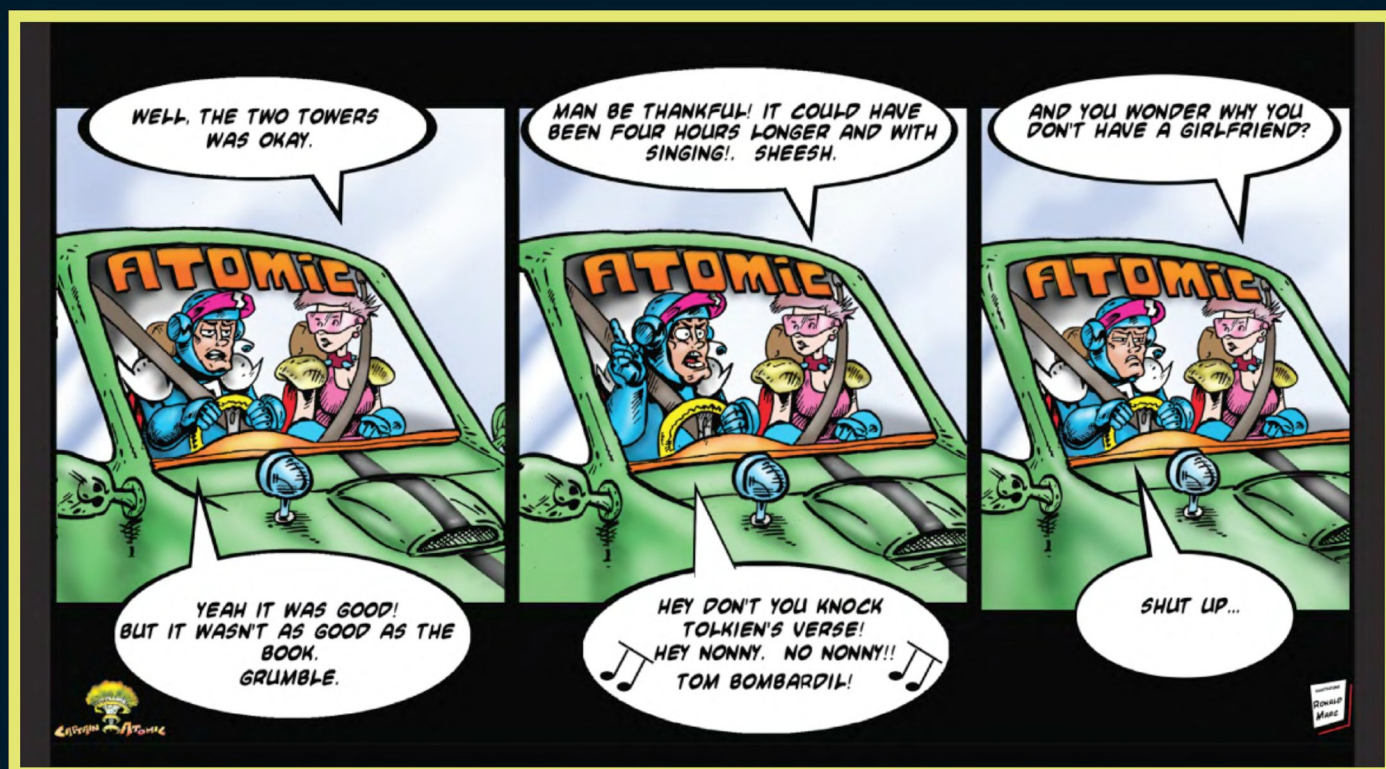
to install, then you unknowingly download the latest Wedgie (sounds better, doesn't it?). I imagine I'm like most other people, blindly installing updates and patches from Microsoft and Sierra in the hope that my PC will run faster, safer and steadier (hell, tell me my seek times would be better if I faced my computer North and I'd do it). In other words, I'd be one of the first to fall for a fake WU patch.

Now that I've given some angry young nerd a good idea, I should really mention the other side of the coin. Some argue that computer viruses and hacks are good for the industry. Just like rockets from World War 1, or the Playboy centrefold from WW2, great tragedies often spawn significant improvements.

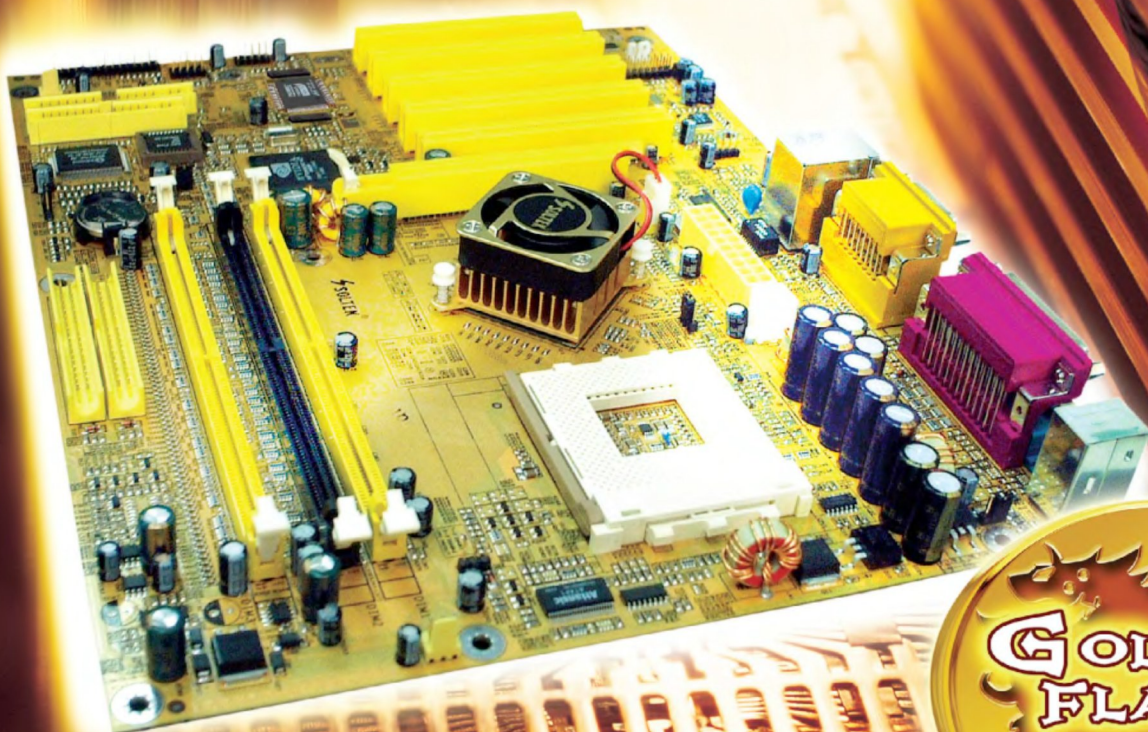
Even Archimedes, the guy who scolded himself in the bath and ran down the street yelling 'Eureka!', ended up discovering displacement theory. Perhaps viruses are the proverbial bath water that boils our most private parts – in the end leading us to greater technological advances.

And one thing we know for sure: if aliens ever come to Earth and start pounding our capital cities, the guy who can write a mean virus program will be the ultimate saviour. Assuming the aliens run Outlook Express and are dumb enough to open attachments.

Ooops, gotta go – someone called 'Hairy Bertha' has just sent me an executable file of her lesbian frolic in the British Parliament. . .
John Simpson



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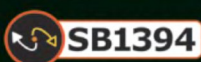
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